PION-02130

<ART-109-0>

SERVICE MANUAL

STEREO AMPLIFIER

SA-9900

D, GN

NOTE:

- MODEL SA-9900 COMES IN THREE VERSIONS DISTINGUISHED AS FOLLOWS:

Round label on rear panel	Voltage	Type
D	120V, 220V and 240V (Switchable)	General export model
GN	220V only	SEMKO (Sweden), NEMKO (Norway), DEMKO (Denmark) and EI (Finland) approved.
KCU	120V only	CSA (Canada) and UL (U.S.A.) approved.

- If you want to see KCU type not described in this manual, you are requested to refer to the service manual furnished with KCU type (ART-095-0).

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1. SPECIFICATIONS

SEMICONDUCTORS

FET(s) 10
Transistors 74
Diodes 33

POWER AMPLIFIER SECTION

Circuitry . . . . . 2-stage differential amplifiers. 3-stage Darlington parallel push-pull, pure-complementary OCL.

Continuous Power Output at 20 Hertz to 20,000 Hertz
(Both channels driven) . . . . . 110 watts per channel (8 ohms)
110 watts per channel (4 ohms)

Continuous Power Output at 1,000 Hertz
(Both channels driven) . . . . . 120 watts per channel (8 ohms)
120 watts per channel (4 ohms)

Total Harmonic Distortion at 20 Hertz to 20,000 Hertz
(Continuous Rated Power Output) . . . . No more than 0.1%
(55 watts per channel Power Output, 8 ohms) . . . . . No more than 0.04%
(1 watt per channel Power Output, 8 ohms) . . . . . No more than 0.04%

Intermodulation Distortion at 20 Hertz to 20,000 Hertz
(Continuous Rated Power Output) . . . . No more than 0.1%
(55 watts per channel Power Output, 8 ohms) . . . . . No more than 0.04%
(1 watt per channel Power Output, 8 ohms) . . . . . No more than 0.04%

Frequency Response . . . . . 10 Hertz to 80,000 Hertz $^{+0}_{-1}$dB

Input: Sensitivity/Impedance
(POWER AMP IN) . . . . . 1V/50 k ohms

Output: Speaker . . . . . A, B, A+B
Headphone . . . . . Low impedance

Damping Factor (20 Hertz to 20,000 Hertz, 8 ohms) 30

Hum & Noise (IHF, Short-circuited, A Network) 110dB

PREAMPLIFIER SECTION

Circuitry
Equalizer amplifier . . . . . 3-stage direct-coupled class-A SEPP type with 1st stage FET equiped differential amplifier
Control amplifier . . . . . 3-stage direct-coupled type with 1st stage FET equiped differential amplifier

Input: Sensitivity/Impedance
PHONO 1 . . . . . 2.5mV/50 k ohms
PHONO 2 . . . . . 2.5mV to 10mV/30 k ohms, 50 k ohms, 70 k ohms, 100 k ohms
MIC . . . . . 6mV to 24mV/85 k ohms
TUNER . . . . . 150mV/50 k ohms
AUX 1 . . . . . 150mV/50 k ohms

AUX 2 . . . . . 150mV/50 k ohms
TAPE PB 1 . . . . . 150mV/50 k ohms
TAPE PB 2 . . . . . 150mV/50 k ohms

PHONO Overload Level (T.H.D. 0.01%)
PHONO 1 . . . . . 500mV (1,000 Hertz)
PHONO 2 . . . . . 500mV to 1.0V (1,000 Hertz)

Output: Level/Impedance
TAPE REC 1 . . . . . 150mV
TAPE REC 2 . . . . . 150mV
PRE OUT . . . . . 2V/1 k ohms

Total Harmonic Distortion at 20 Hertz to 20,000 Hertz . . . . . No more than 0.05%

Frequency Response
PHONO (RIAA equalization) . . . . . 30 Hertz to 15,000 Hertz ±0.2dB
TUNER, AUX, TAPE PB . . . . . 7 Hertz to 40,000 Hertz $^{+0}_{-1}$dB

Tone Control (1.5dB step)
BASS . . . . . SUB ±4.5dB (50 Hertz)
MAIN ±7.5dB (100 Hertz)
TREBLE . . . . . SUB ±4.5dB (20,000 Hertz)
MAIN ±7.5dB (10,000 Hertz)

Filter
LOW . . . . . 15 Hertz, 30 Hertz (12dB/oct.)
HIGH . . . . . 8,000 Hertz, 12,000 Hertz (12dB/oct.)

Hum & Noise (IHF, Short circuited, A Network)
PHONO 1 & 2 . . . . . 70dB
MIC 65dB
TUNER, AUX 1 & 2, TAPE PB 1 & 2 . . 95dB

Attenuator . . . . . 0, −15dB, −30dB

MISCELLANEOUS

Power Requirements . . . . . AC 220V 50/60 Hertz or 120, 220 and 240V (Switchalbe) 50/60 Hertz

Power Consumption 410W

Dimensions . . . . . 420(W) x 165(H) x 403(D) mm
16-1/2 x 6-1/2 x 15-7/8 in.

Weight: Without Package . . . . . 20kg (44 lb 1 oz)
With Package . . . . . 22.4kg (49 lb 6 oz)

FURNISHED PARTS

Hex. Wrench (used for fasting VOLUME knob) 1
Jack covers (input, output) 22
AC outlet covers (3-line voltage model only) 3
Fuse 8A . . . . . 1)
Fuses 4A . . . . . 2) (3-line voltage model only)
Factory Tested Date 1
Connection Cord with Pin Plugs 1
Operating Instructions 1

NOTE:
Specifications and the design subject to possible modification without notice due to improvements.

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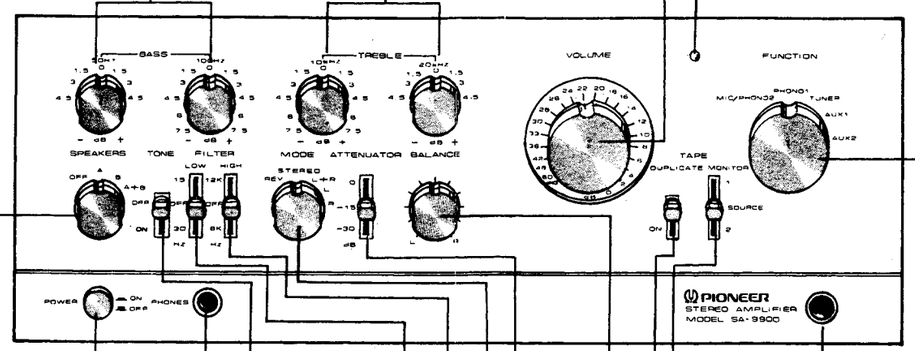
2. FRONT PANEL FACILITIES



BASS TWIN CONTROL

Adjusts low frequency tone.

100Hz: Adjusts frequence band below 400Hz. Control effectiveness at 100Hz is ±7.5dB.

50Hz: Provides additional control to the 100Hz knob for the frequency band below 200Hz. Control effectiveness at 50Hz is ±4.5dB.

TREBLE TWIN CONTROL

Adjusts high frequency tone.

10kHz: Adjusts frequency band above 2.5kHz. Control effectiveness at 10kHz is ±7.5dB.

20kHz: Provides additional control to the 10kHz knob for the frequency band above 5kHz. Control effectiveness at 20kHz is ± 4.5dB.

VOLUME CONTROL

Adjusts output level to speakers and headphones. Scale is graduated in dB with 0dB at maximum level. When employed in combination with the ATTENUATOR switch, finer and wider range attenuation can be performed.

PILOT LAMP

Lights when AC power is turned on.

SPEAKERS SWITCH

OFF: Cuts off speaker sound (when using headphones only).

A: Sound obtained from speakers connected to A speaker terminals.

B: Sound obtained from speakers connected to B speaker terminals.

A + B: Sound obtained from speakers connected to both A and B speaker terminals.

FUNCTION SWITCH

PHONO 1: For playing records on a turntable connected to the PHONO 1 jacks.

MIC/PHONO 2: Same as above, for PHONO 2 jacks, or for reproduction through a microphone connected to the MIC jack on the front panel. Note, when the microphone is connected to the jack, the turntable connected to the PHONO 2 jacks cannot be used.

TUNER: For listening to broadcasts through the tuner.

AUX 1: For playing signals fed to the AUX 1 jacks.

AUX 2: Same as above, for AUX 2 jacks.

POWER SWITCH

Depress to turn on AC power.
After the POWER switch is set to ON, a few seconds will elapse before sound is obtained. This is due to the built-in muting circuit and does not signify difficulty.

MIC JACK

Accepts the plug of the microphone.

PHONES JACK

Output jack for stereo headphones.

LOW FILTER SWITCH

Attenuates low frequency noise.

15Hz: Provides 12dB/octave attenuation for frequencies below 15Hz.

OFF: Set to this position when not employing filter.

30Hz: Provides 12dB/octave attenuation for frequencies below 30Hz.

ATTENUATOR SWITCH

Attenuates the output level as follows:

0dB: No attenuation

-15dB: Attenuates by 15dB

-30dB: Attenuates by 30dB

TAPE MONITOR SWITCH

1: Playback or monitoring of tape deck connected to the TAPE 1 (REC & PB) jacks.

SOURCE: Set to this position at times other than tape playback.

2: Playback or monitoring of tape deck connected to the TAPE 2 (REC & PB) jacks.

TONE SWITCH

When set to OFF, the TONE control circuit is disengaged and frequency response becomes flat. The BASS and TREBLE twin controls do not function at this time.
Convenient for checking phono cartridge and speaker tone, tone control effectiveness, and listening room acoustics.

HIGH FILTER SWITCH

Attenuates high frequency noise, such as scratches and tape hiss.

12kHz: Provides 12dB/octave attenuation for frequencies above 12kHz.

OFF: Set to this position when not employing filter.

8kHz: Provides 12dB/octave attenuation for frequencies above 8kHz.

MODE SWITCH

REV: Reverses left and right channel stereo signals.

STEREO: Normal stereo reproduction.

L + R: Mixes left and right channel signals for mono reproduction.

L: Mono reproduction of left channel signal through both speakers.

R: Mono reproduction of right channel signal through both speakers.

TAPE DUPLICATE SWITCH

Set to ON when employing 2 tape decks to duplicate or edit tapes. Be sure to set to OFF (upper position) at other times.

BALANCE CONTROL

Adjusts left and right volume balance of speakers and headphones. Turn clockwise from center to increase right channel (R) volume, and counterclockwise from center to increase left channel (L) volume.

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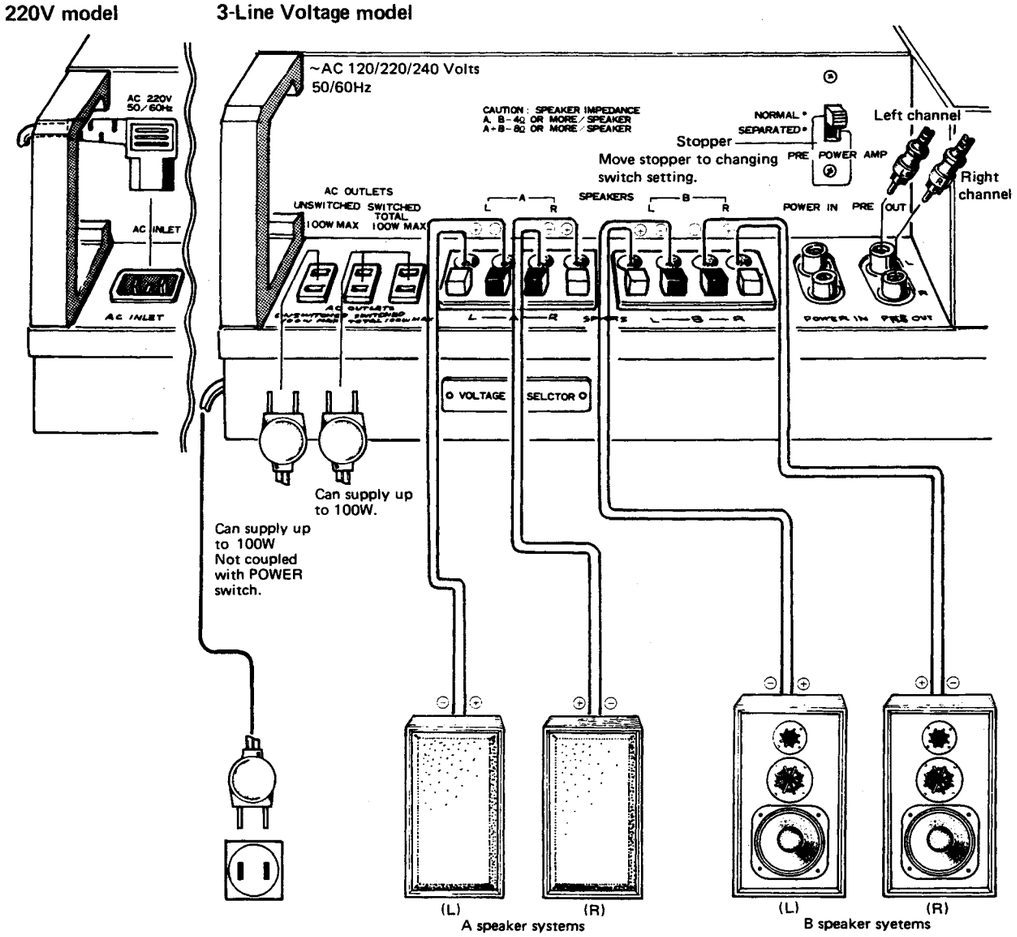
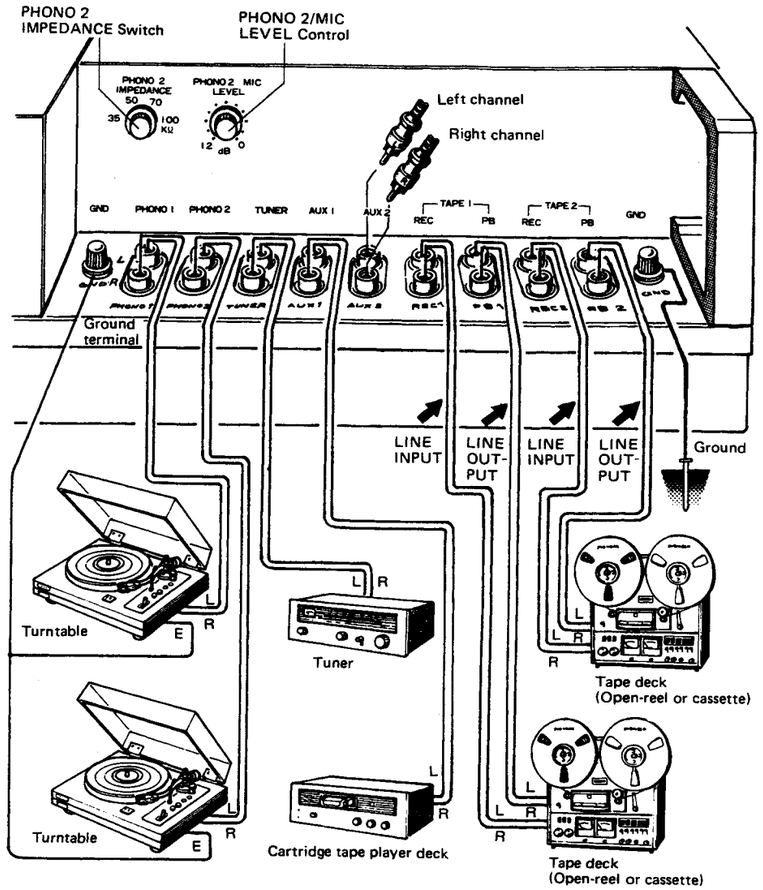
3. CONNECTION DIAGRAM

220V model

3-Line Voltage model





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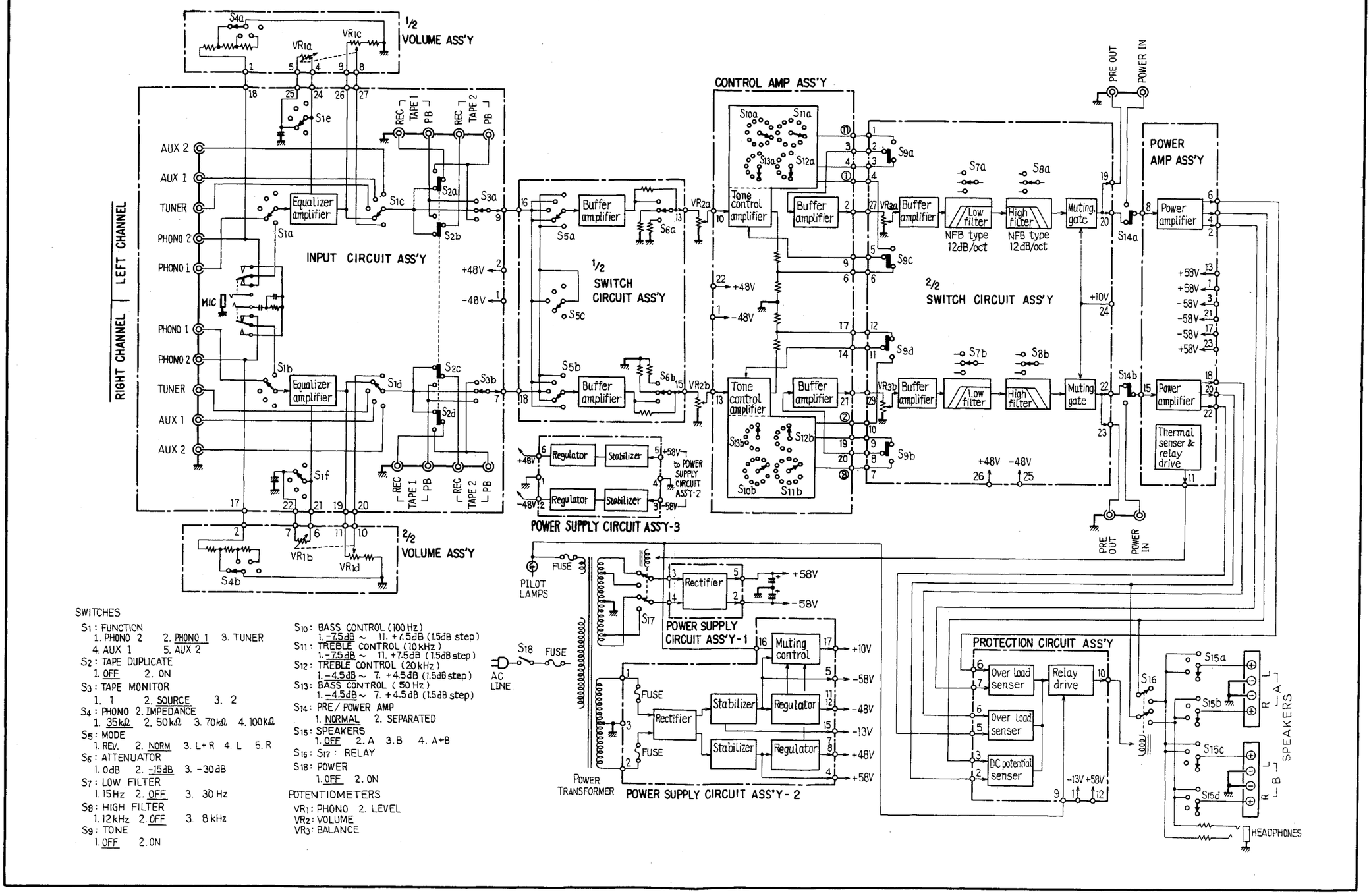
4. BLOCK DIAGRAM



SWITCHES

- S1 : FUNCTION
  1. PHONO 2 2. PHONO 1 3. TUNER
  4. AUX 1 5. AUX 2
- S2 : TAPE DUPLICATE
  1. OFF 2. ON
- S3 : TAPE MONITOR
  1. 1 2. SOURCE 3. 2
- S4 : PHONO 2. IMPEDANCE
  1. 35kΩ 2. 50kΩ 3. 70kΩ 4. 100kΩ
- S5 : MODE
  1. REV. 2. NORM 3. L+R 4. L 5. R
- S6 : ATTENUATOR
  1. 0dB 2. -15dB 3. -30dB
- S7 : LOW FILTER
  1. 15Hz 2. OFF 3. 30 Hz
- S8 : HIGH FILTER
  1. 12kHz 2. OFF 3. 8 kHz
- S9 : TONE
  1. OFF 2. ON
- S10 : BASS CONTROL (100 Hz)
  1. -7.5dB ~ 11. +7.5dB (1.5dB step)
- S11 : TREBLE CONTROL (10 kHz)
  1. -7.5dB ~ 11. +7.5dB (1.5dB step)
- S12 : TREBLE CONTROL (20 kHz)
  1. -4.5dB ~ 7. +4.5dB (1.5dB step)
- S13 : BASS CONTROL (50 Hz)
  1. -4.5dB ~ 7. +4.5dB (1.5dB step)
- S14 : PRE/ POWER AMP
  1. NORMAL 2. SEPARATED
- S15 : SPEAKERS
  1. OFF 2. A 3. B 4. A+B
- S16 : S17 : RELAY
- S18 : POWER
  1. OFF 2. ON

POTENTIOMETERS

- VR1 : PHONO 2. LEVEL
- VR2 : VOLUME
- VR3 : BALANCE

5. BRIEF DESCRIPTION AND FEATURES OF CIRCUITS

Equalizer Amplifier Circuit

The circuit diagram of the equalizer amplifier circuit used in the SA-9900 is shown in Fig. 1. The first stage of this circuit is a differential amplifier consisting of two field-effect transistors (FETs), and the output stage is a single-ended push-pull (SEPP) amplifier which provides a maximum output signal voltage of approximately 29V with a distortion of 1%.

(1) Selection of input impedance

If the resistance R1 in Fig. 1 is infinite, the input impedance of the equalizer amplifier circuit is designed so as to be 125kΩ.

If the FUNCTION selector switch on the front panel is set to PHONO 1, the resistance of R1 is 82kΩ, thus the input impedance of the PHONO 1 terminals becomes 50kΩ.

If the FUNCTION selector switch is set to PHONO2/MIC, the resistance of R1 can be selected as 48.6kΩ, 83.3kΩ, 159.1kΩ, or 500kΩ with the PHONO 2 IMPEDANCE switch on the right-hand side panel.

The input impedance of the PHONO 2 terminals, therefore, can be set to 35, 50, 70 or 100kΩ.

(2) Changing of input sensitivity

The amount of AC signal negative feedback in the equalizer amplifier circuit is determined by the values of the equalizer RC network and resistor R2. If the FUNCTION selector switch is set to PHONO 1 the resistance of R2 is 1.54kΩ. This was established so that the rated output can be obtained with input signal of 2.5mV at 1kHz. If the FUNCTION selector switch is set to PHONO 2/MIC, the resistance of R2 can be varied in the range 1.54 - 3.24 kΩ with the PHONO 2/MIC LEVEL control on the right-hand side panel. This permits the input sensitivity to be varied between 2.5 and 5mV. By turning the PHONO 2/MIC LEVEL control, the variable resistor VR indicated by a dotted line in Fig. 1 also moves. The input sensitivity of the PHONO 2 terminals can therefore be varied throughout the range 2.5 - 10mV.

Protection Circuit

Fig. 2 is a block diagram of the protection circuit used in the SA-9900. The protection circuit functions to detect DC voltages in the power amplifier output circuit and power transistor overloads and overcurrents, to mute click noise produced by turning the POWER switch ON or OFF, and to prevent abnormal over-heating of the power transistor heat sink. When any of these is detected, the protection circuit operates the relay connected to the power amplifier output circuit to interrupt the speakers. Particularly, for the muting preventing click noise, a fieldeffect transistor muting gate is placed on the input side of the power amplifier so that the power amplifier input signal can be interrupted at its input side. This makes sure that the relay contacts turn on or off without sparks because there is no output signal, thus preventing deterioration of the relay contacts and improving the reliability of relay operation.

- Heat Sink Over-heating Prevention Circuit

If the SA-9900 is operated continuously at full power with a 4Ω load, the power transistor heat sink temperature increases greatly. Excessively high heat sink temperature is dangerous if touched, etc., as it is exposed on the rear panel (No problem is practice). For safe handling, this model is provided with a heat sink over-heating prevention circuit which maintains the heat sink temperature below 85°C.

The heat sink temperature is detected by posistors (positive coefficient thermistor), which are placed in the circuit shown in Fig. 3. As shown in the resistance-temperature characteristic (Fig. 4), the posistor resistance hardly changes up to a certain temperature, but increases abruptly at temperatures higher than the temperature specified.

In the over-heating prevention circuit shown in Fig. 3, the posistors serve as the bias circuits for transistors, which operate the relay if the heat sink temperature exceeds the over-heating temperature. The relay, then, changes the power transformer secondary winding tap connections so that the secondary voltage is lowered, thus preventing the heat sink temperature from increasing too much.

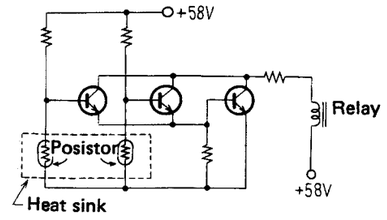


Fig. 3 Diagram of Heat Sink Overheating Preventing Circuit

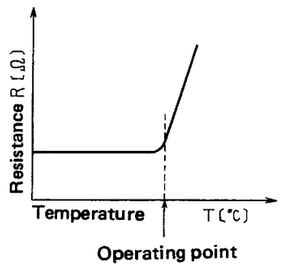


Fig. 4 Posistor Resistance-Temperature Characteristic

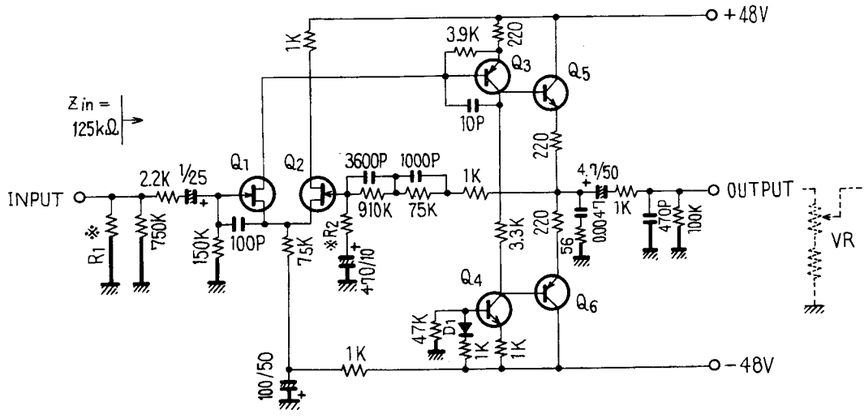


Fig. 1 Circuit Diagram of Equalizer Amplifier

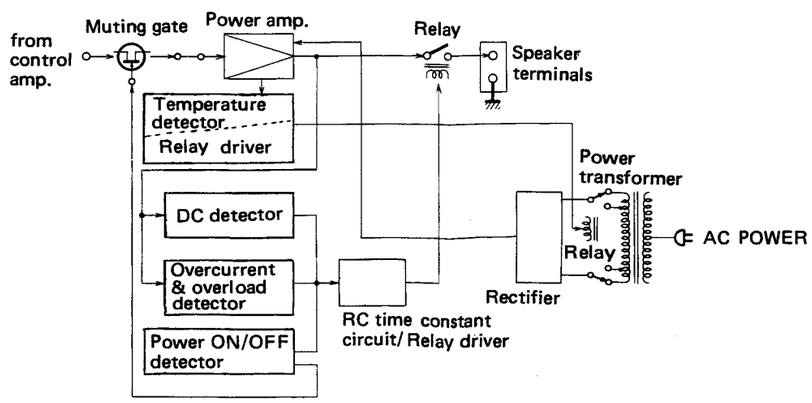


Fig. 2 Block Diagram of Protection Circuit

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6. DISASSEMBLY INSTRUCTIONS

Disassembly Cautions

(1) Great care should be taken in handling the SA-9900/KCU since it is very heavy and the front panel and heat sink fins are exposed.
(2) When replacing components, be sure to disassemble them in the correct order and to identify the disassembly positions.
(3) Most of the printed circuit boards cannot be checked unless they are removed from the chassis. When removing them, great care should be taken not to touch them against any other components nor to short any circuit.
(4) Do not exert excessive force on the side panel stays as they may be bent.
(5) There are many screws of different types. It is recommended therefore that you make a note of the positions from which they are removed.

Removing the Top Cover

Unscrew the six (6) screws (A) on the top cover. Lift up the top cover.

Removing the Front Shield Cover

After removing the top cover, unscrew the two (2) screws (B) on the front shield cover. Lift up the front shield cover.

Removing the Front Panel

Remove all front panel knobs (C) except the POWER switch knob. For the VOLUME control knob, loosen the set screws with a hexagonal wrench before removing it. Remove the BASS 50Hz, SPEAKERS, and FUNCTION switch shaft nuts and washers. The front panel is ready for removal.

Removing the Bottom Plate

Stand the main body with the heat sink down. Unscrew the ten (10) screws (D). Remove the bottom plate.

Removing the Right Side Panel (input terminal side)

After removing the top cover and front shield cover, pull out the PHONO 2/MIC LEVEL and IMPEDANCE control knobs. Unscrew the sixteen (16) screws (E). Remove the side panel.

Removing the Left Side Panel (output terminal side)

After removing the top cover and front shield cover, unscrew the six (6) screws (F). Remove the side panel (L).

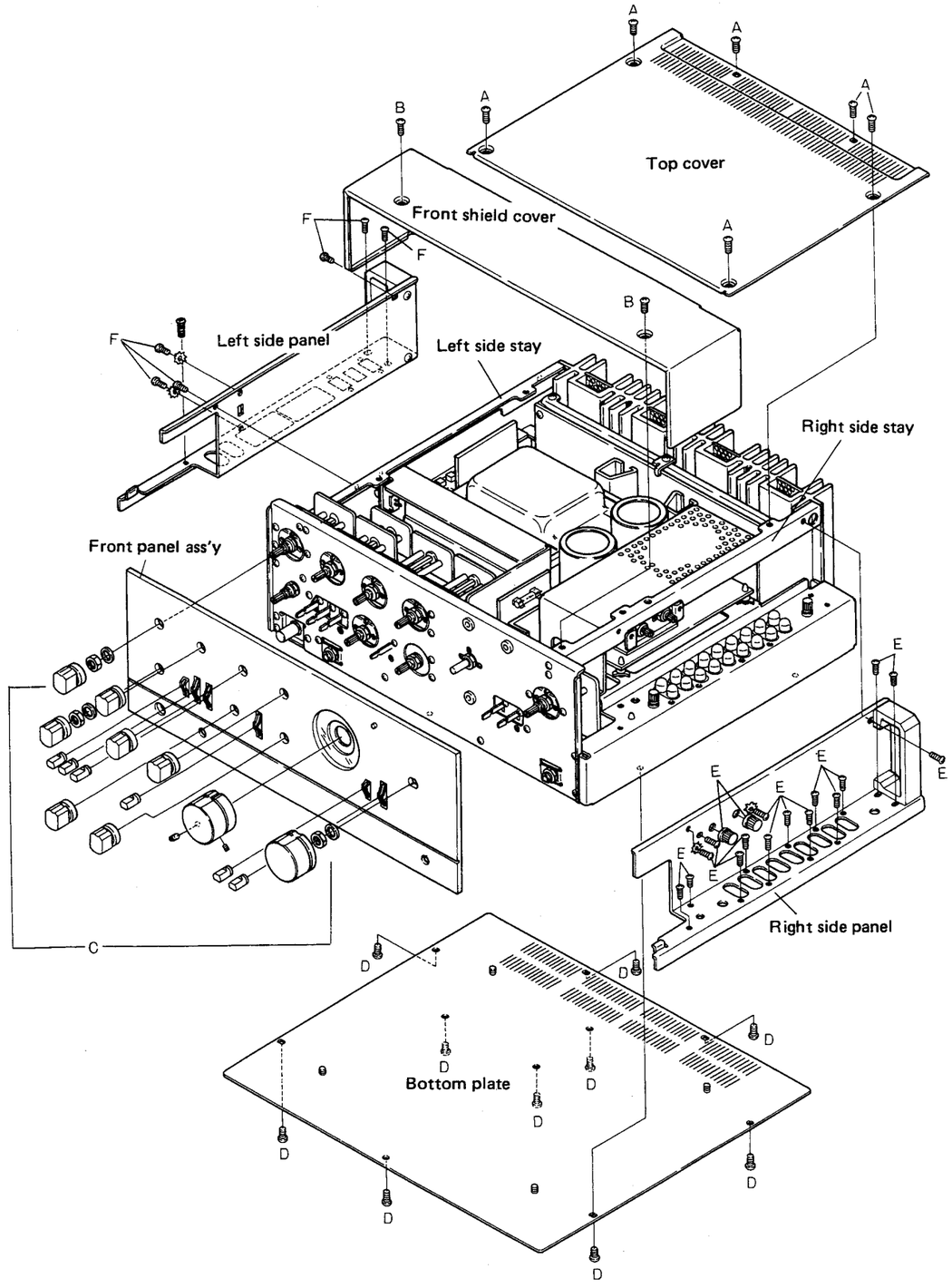


Fig. 5

Removing the Power Amplifier Printed Circuit Board Assembly (Fig. 6)

(1) After the top cover and bottom plate have been removed, the power amplifier can be adjusted.
(2) The power transistors can be replaced by pulling the transistor covers out of the heat sink guides and unscrewing their two screws.
(3) Unscrew the posistor fixing screws located at the lower part of the center of the heat sink. Loosen the varistor fixing screw at the upper part of the center of the heat sink. Remove the varistor.
(4) Stand the main body on the bottom plate so it is not touching the bench. Unscrew the eight (8) screws at both sides of the heat sink. This allows the power amplifier printed circuit board to be turned forward.
(5) Unscrew the four(4) printed circuit board fixing screws and screws Ⓐ and Ⓑ. This allows the printed circuit board to be removed from the heat sink. After this has been done amplifier can be checked.

Removing the Protection Printed Circuit Board Assembly (Fig. 7)

(1) Remove the top cover, front shield cover, bottom plate, and left side panel.
(2) Unscrew the two screws mounting the printed circuit board fixing brackets on the chassis. This permits the printed circuit board to be inclined to an angle depending on the length of the lead wires.

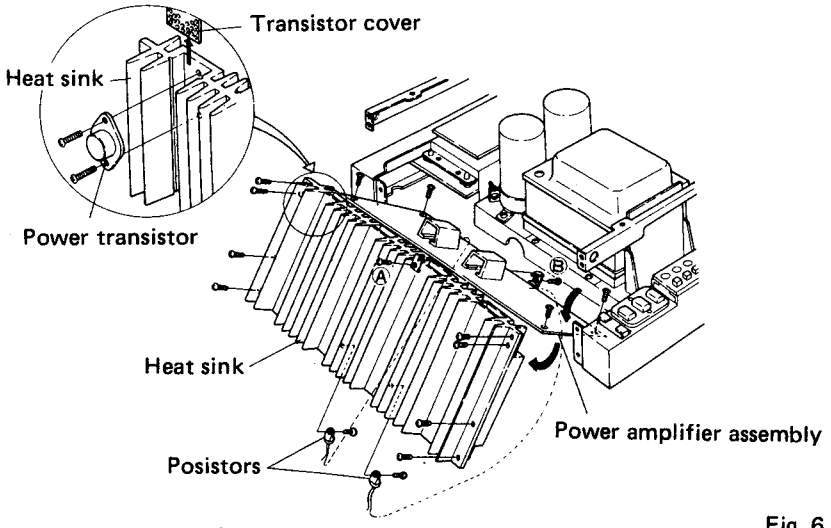


Fig. 6

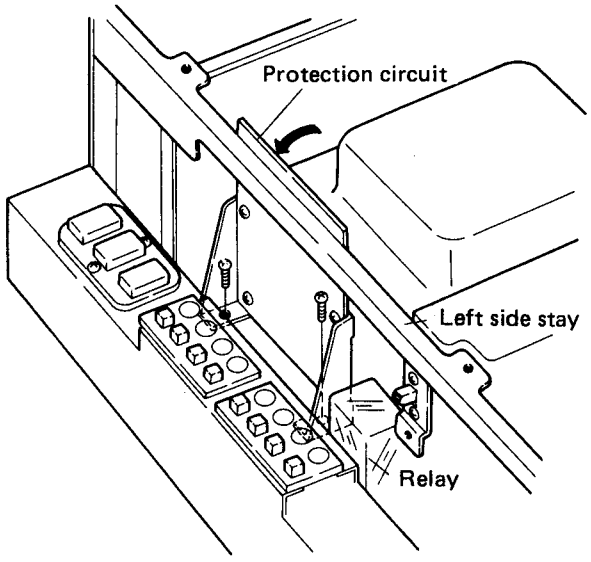


Fig. 7

Removing the Power Supply Printed Circuit Board Assembly-1(Fig. 8)

(1) Remove the top cover, front shield cover, and bottom plate. This allows the 1A protection fuse (F4) in the pilot lamp circuit to be replaced.
(2) Unscrew the two (2) screws which mount the printed circuit board on the chassis. This allows the printed circuit board to be moved, though the distance is limited by the length of its lead wire.

Removing the Power Supply Printed Circuit Board Assembly-2 (Fig. 8)

(1) Remove the top cover, front shield cover, and right side panel. Remove the shield case. Pull up the printed circuit board from the bosses.
(2) Be careful not to touch the volume control assembly against any other part.

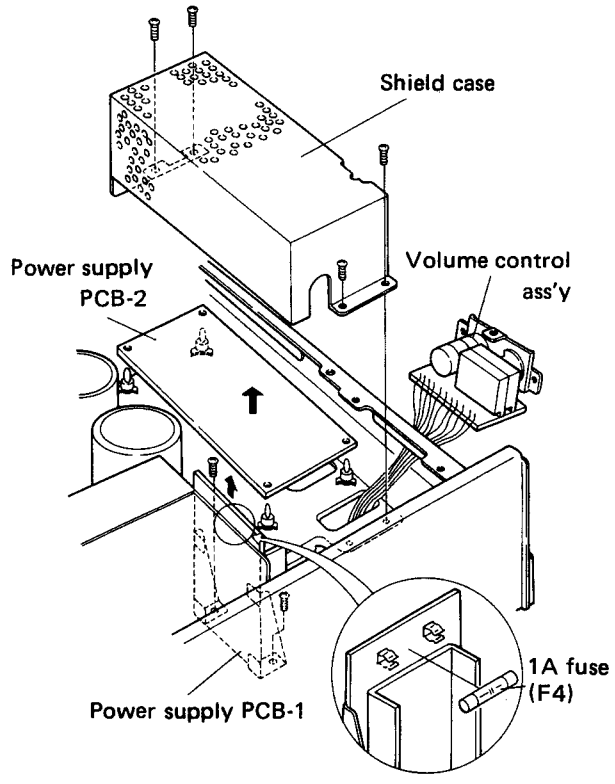


Fig. 8

Removing the Control Amplifier Printed Circuit Board, Tone Switch Circuit Assembly and Switch Circuit Assembly

(1) Remove the top cover, front shield cover, front panel, and left side panel.
(2) Unscrew the three (3) screws which mount the control amplifier printed circuit board shield plate on the chassis. Pull up the shield plate.
(3) Unscrew the two (2) screws which mount the printed circuit board fixing brackets on the chassis. Lift up the printed circuit board by turning it with its lower end.
(4) Unscrew the heat sink top screws and two panel stay screws. Remove the left side stay.
(5) Unscrew the five (5) screws of the panel stay. Remove the tone switch circuit assembly by moving it forward.
(6) Unscrew the eighteen (18) screws of the panel stay and PHONES jack, SPEAKERS selector switch shaft and VOLUME control shaft nuts and washers. Remove the switch circuit assembly by inclining the panel stay.

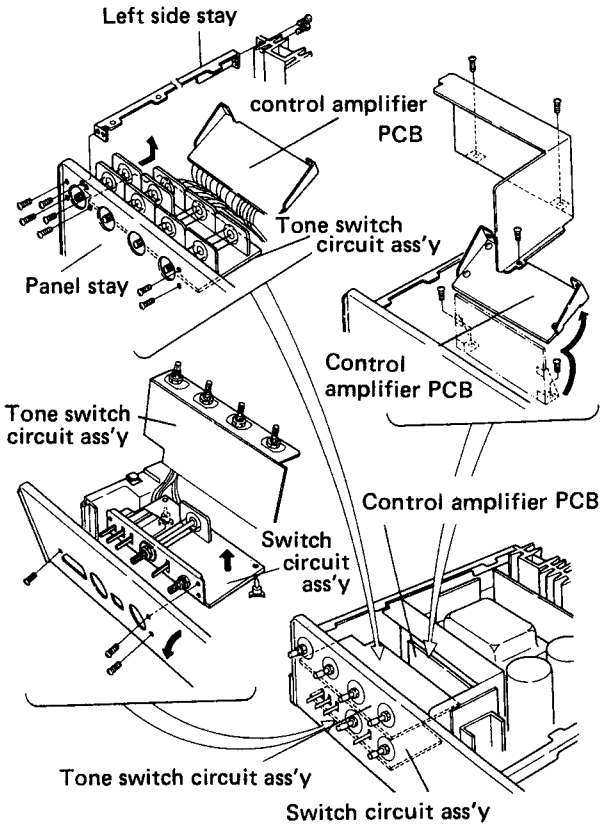


Fig. 9

Removing the Input Circuit Assembly (Fig. 10)

The PHONO jacks, TAPE MONITOR and DUPLICATE lever switches, and FUNCTION rotary switch are installed on the input circuit assembly printed circuit board.

(1) Remove the top cover, front shield cover, front panel, bottom plate, and right side panel.
(2) Remove the shield case and power supply printed circuit board-2.
(3) Unscrew the twenty four (24) screws of the panel stay and PHONES jack and SPEAKERS selector switch shaft and VOLUME control shaft nuts and washers. Incline the panel stay.
(4) Pull out the printed circuit board from the bosses.

Removing the Fuse Board Assembly (Fig. 11)

(1) Remove the bottom plate.
(2) Pull out the printed circuit board from the bosses.

Removing the Pilot Lamps (Fig. 12)

(1) Remove the top cover, front shield cover, and bottom plate.
(2) The power indicating lamp and the two upper VOLUME control illuminating lamps can now be pulled out of the lamp holders.
(3) Remove the front panel.
(4) Unscrew the twenty four (24) screws of the panel stay and PHONES jack, SPEAKERS selector switch shaft and VOLUME control shaft nuts and washers. Incline the panel stay to the front.
(5) When this has been done the lower VOLUME control illuminating lamp can be pulled out of its lamp holder.

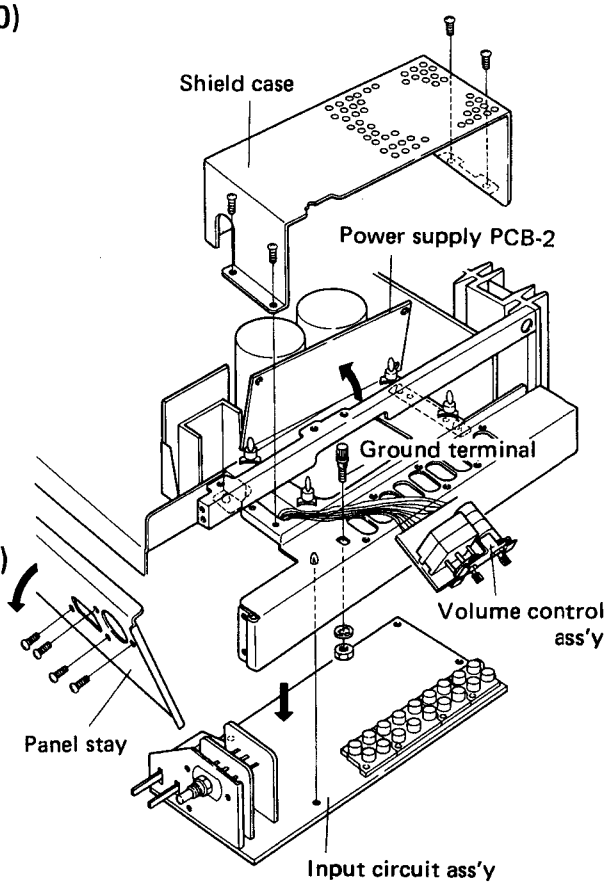


Fig. 10

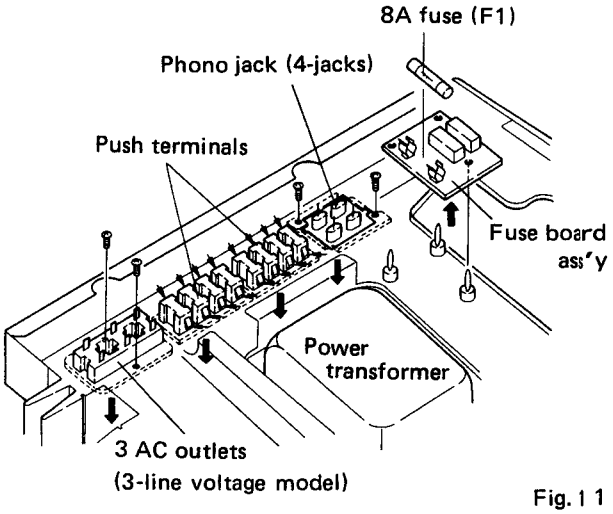


Fig. 11

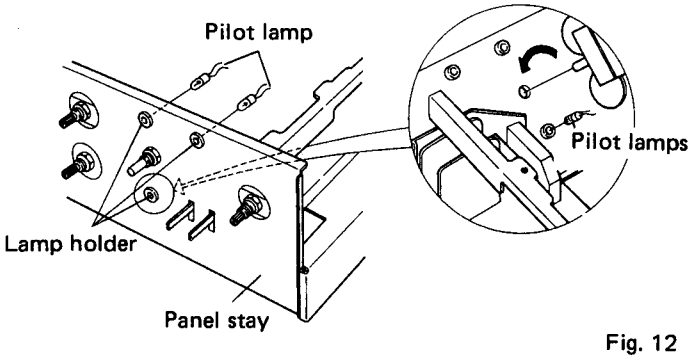
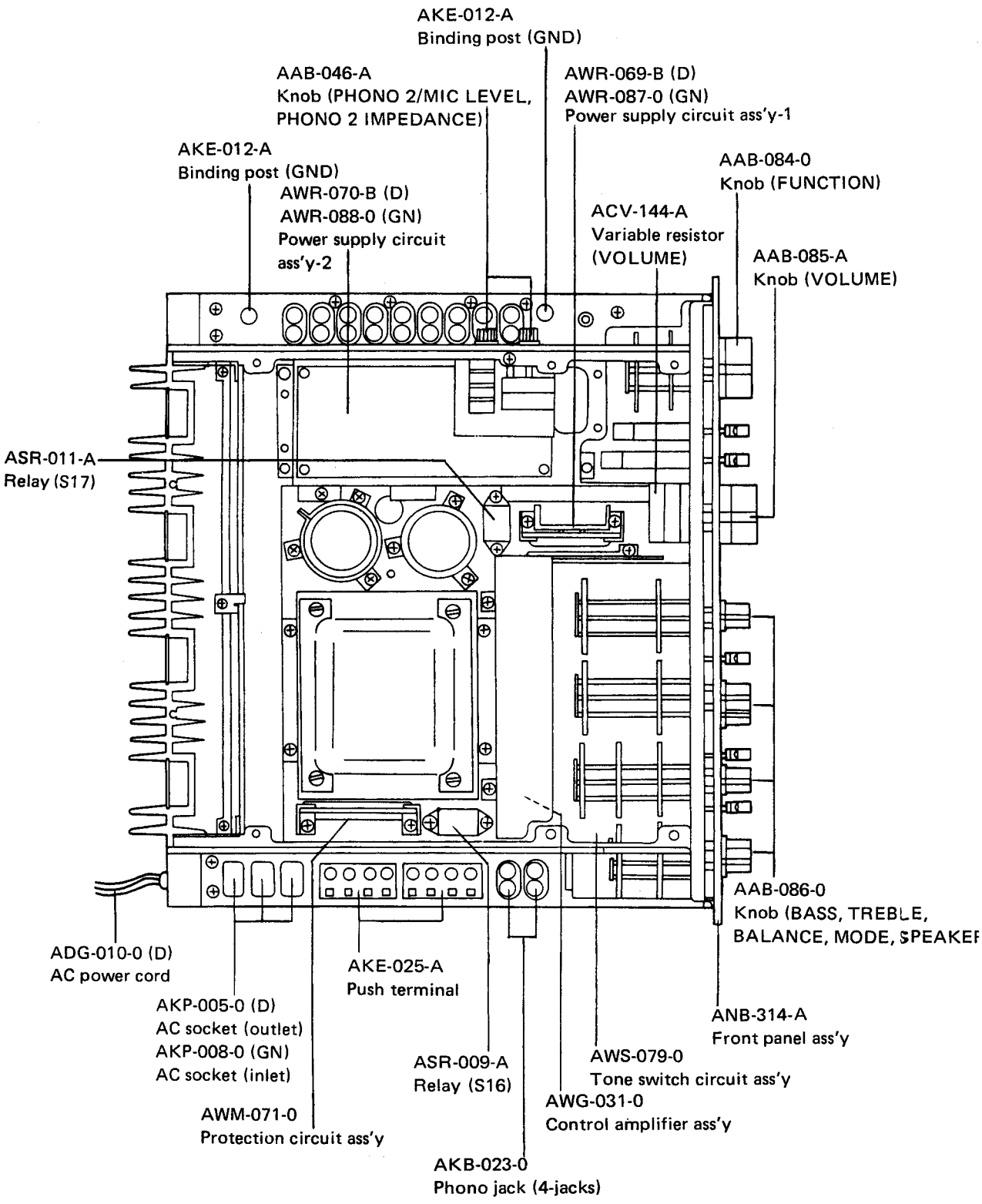


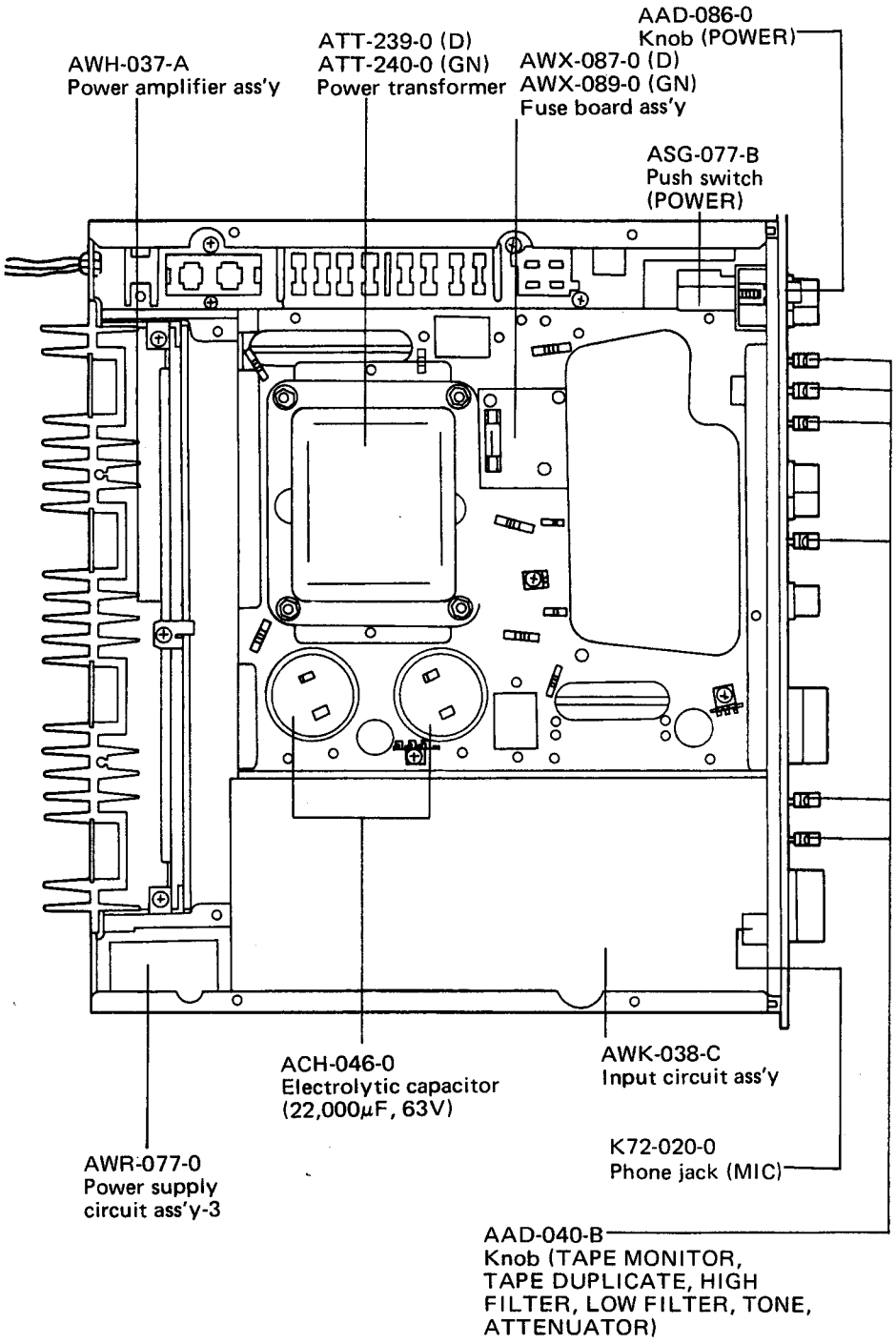
Fig. 12

7. PARTS LOCATION

Top View



Bottom View


AAD-086-0
Knob (POWER)
ATT-239-0 (D)
ATT-240-0 (GN)
Power transformer
AWH-037-A
Power amplifier ass'y
AWX-087-0 (D)
AWX-089-0 (GN)
Fuse board ass'y
ASG-077-B
Push switch
(POWER)
ACH-046-0
Electrolytic capacitor
(22,000μF, 63V)
AWK-038-C
Input circuit ass'y
K72-020-0
Phone jack (MIC)
AWR-077-0
Power supply
circuit ass'y-3
AAD-040-B
Knob (TAPE MONITOR,
TAPE DUPLICATE, HIGH
FILTER, LOW FILTER, TONE,
ATTENUATOR)

8. ADJUSTING PROCEDURES FOR JUNCTION POINT AND IDLE CURRENT

Set-up

(a) Remove the top cover and bottom plate, and stand the main body with the heat sinks down.
(b) Before turning on the POWER switch, turn VR3 and VR4 all the way to the left (counterclockwise).
(c) For adjustment, wait 10 minutes after the POWER switch is turned on.

Adjusting procedures

(1) Set the PRE/POWER AMP switch to the SEPARATED (lower) position.
(2) Fit 5.1kΩ resistors to the POWER IN terminals as shown in Fig. 13.
(3) Connect 8Ω dummy loads between the SPEAKER A terminals as shown in Fig. 13.
(4) Set the SPEAKERS switch to position A. Turn on the POWER switch.
(5) Connect a DC voltmeter (100mV/full scale) between pins 4 and 5. Adjust VR1 until the voltmeter indicates 0V.
(6) Connect the DC voltmeter between pins 20 and 19. Adjust VR2 until the voltmeter indicates 0V.

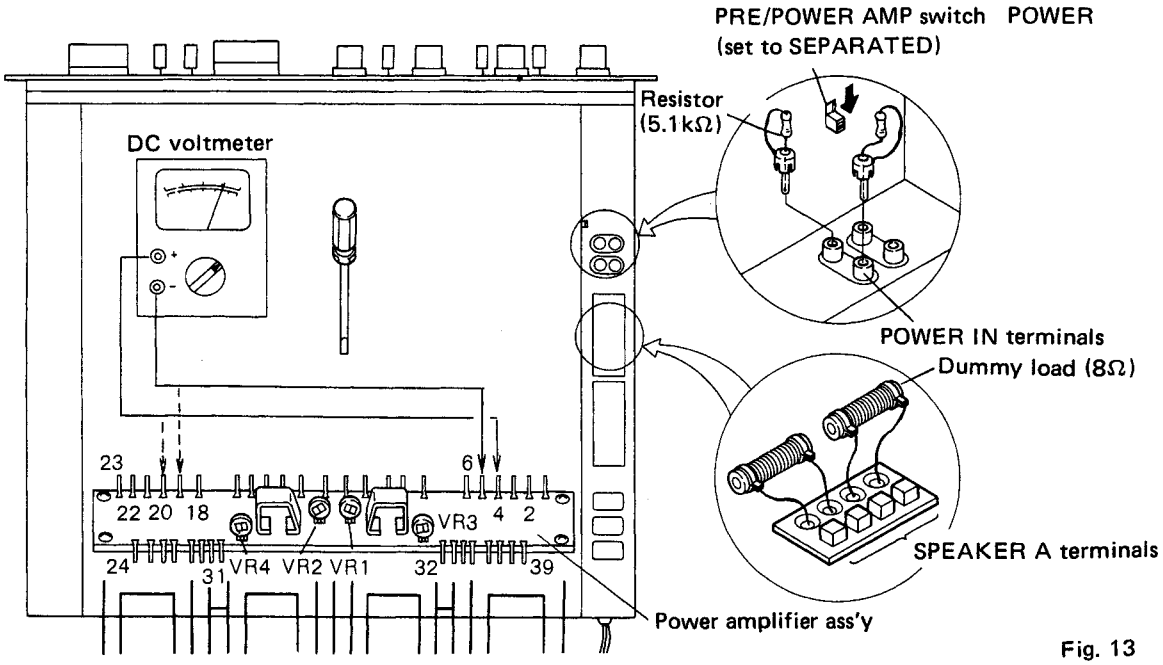


Fig. 13

(7) Connect the DC voltmeter between pins 2 and 6. Adjust VR3 until the voltmeter indicates 50mV.
(8) Connect the DC voltmeter between pins 18 and 22. Adjust VR4 until the voltmeter indicates 50mV.

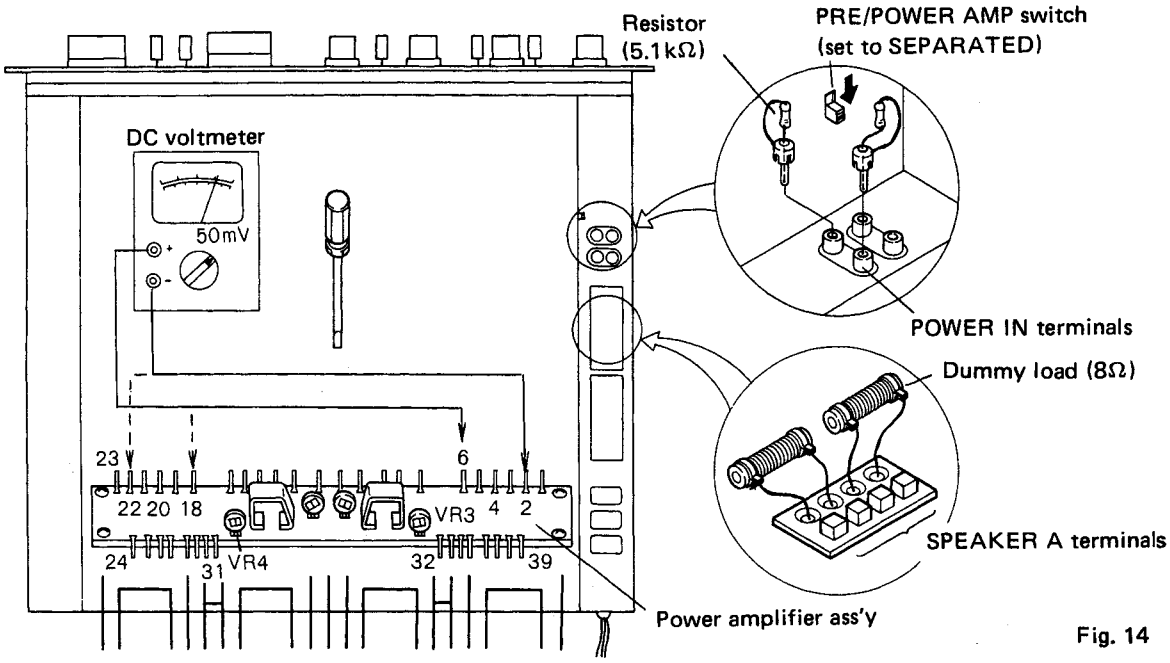


Fig. 14

Making sure the temperature detecting circuit operates correctly

(1) Remove the posistors from the heat sink.
(2) Check that when the posistors are heated to over 85°C with a hair dryer, etc., the relay operates.

9. EXPLODED VIEW AND PARTS LIST

NOTE:
Parts number is subject to change for the purpose of improvement with notice of a service bulletin.
Service bulletin will be furnished whenever necessary and you are requested to amend parts number in this manual according to the instructions.

Part List of Exploded Views

NOTICE: Any parts asterisked (*) are subject to being not supplied.

Key No.	Description	Part No.	
1	Wire guide	ANK-073-A	
2*	Side panel (L)	ANB-337-A	D
	Side panel (L)	ANB-338-0	GN
3*	Side stay (L)	AND-081-B	
4*	Slide switch mount	ANF-287-0	
5	Slide switch (S14, PRE/POWER AMP)	ASH-012-0	
6	Tone switch circuit assembly	AWS-079-0	
7	Switch circuit assembly	AWS-080-0	
8*	Socket mount metal	ANF-324-0	GN
9*	Shield cover	ANH-234-0	
10	Rotary switch (S15, SPEAKERS)	ASB-047-0	
11*	Panel stay	AND-086-0	
12	Push switch (S18, POWER)	ASG-077-B	
13*	Switch mount plate	ANF-289-0	
14	Phone jack (PHONES)	K72-026-0	
15	Variable resistor (VR2, VOLUME)	ACV-144-A	
16	Claw washer	ABE-001-0	
17	Special nut	ABN-009-0	
18	Nut (9ϕ)	B71-004-0	
19*	Lamp holder	AEB-051-A	
20	Lamp (with leads, PL1, 8V 50mA)	AEL-022-0	
21	Front panel assembly	ANB-314-A	
22	Washer (t = 1 mm)	M45-086-A	
23	Nut (9ϕ)	B71-004-0	
24	Knob (BASS-50Hz, BASS-100Hz TREBLE-10kHz, TREBLE-20kHz SPEAKERS, MODE, BALANCE)	AAB-086-0	
25	Knob (TONE, LOW FILTER, HIGH FILTER, ATTENUATOR, TAPE MONITOR, TAPE DUPLICATE)	AAD-040-B	
26	Knob (POWER)	AAD-086-0	
27	Knob (VOLUME)	AAB-085-A	
28	Knob (FUNCTION)	AAB-084-0	
29	Power transformer	ATT-239-0	D
	Power transformer	ATT-240-0	GN
30*	Shield cover	ANH-233-A	
31	Control amplifier assembly	AWG-031-0	
32	Protection circuit assembly	AWM-071-0	
33*	Sub-chassis	ANF-290-0	
34	Power supply circuit assembly-1	AWR-069-B	D
	Power supply circuit assembly-1	AWR-087-0	GN
35	AC socket cover	AEC-209-0	D

NOTICE: Any parts asterisked (*) are subject to being not supplied.

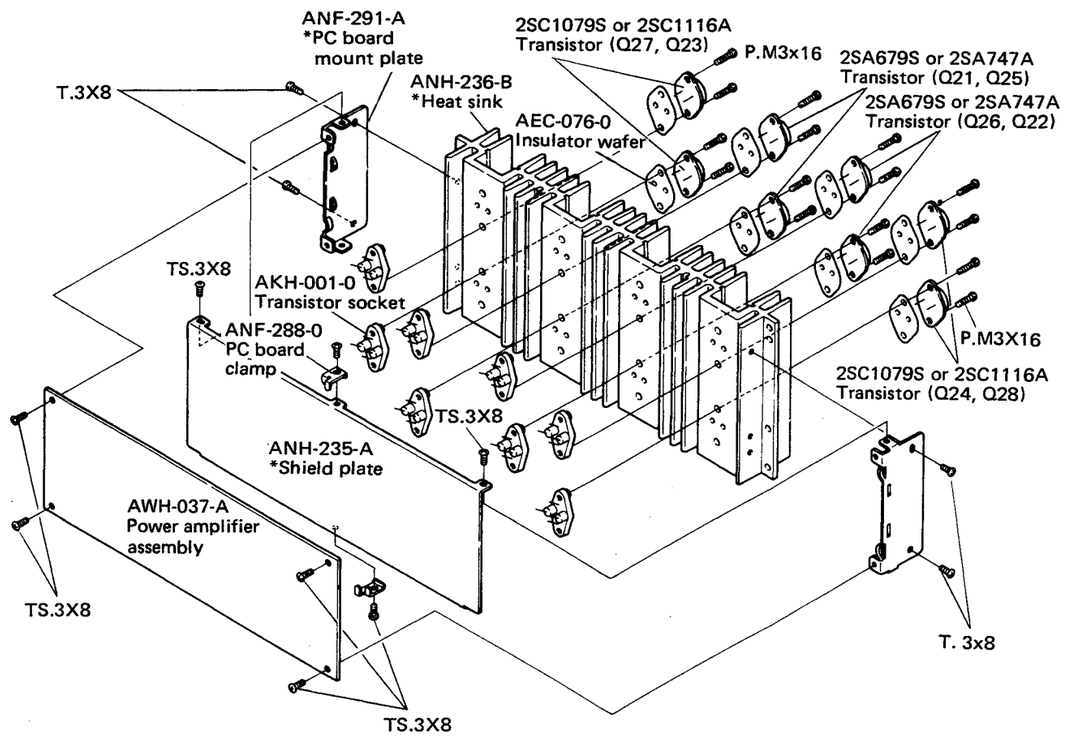
Key No.	Description	Part No.	
36	AC socket (outlet)	AKP-005-0	D
	AC socket (inlet)	AKP-008-0	GN
37	Push terminal (SPEAKERS)	AEK-025-0	
38	Relay (S16)	ASR-009-A	
39	Phono jack cover	AEC-182-0	
40	Phono jack (4-jacks, RCA type)	AKB-023-0	
41*	Chassis (L)	ANA-087-0	D
	Chassis (L)	ANA-088-0	GN
42*	Wire clip (A)	AEC-009-0	
43*	Chassis (C)	ANA-075-C	
44*	Wire clip (D)	AEC-024-0	
45*	Boss	AEC-183-0	
46	Fuse board assembly	AWX-087-0	D
	Fuse board assembly	AWX-089-0	GN
47	Ground terminal 2P	K13-048-0	
48	Chassis (R)	ANA-076-0	
49	Input circuit assembly	AWK-038-C	
50	Binding post (GND)	AKE-012-A	
51	Claw washer	ABE-006-0	
52	Nut (7ϕ)	B71-010-0	
53*	Side panel (R)	ANB-336-0	
54	Knob (PHONO 2 LEVEL, IMPEDANCE)	AAB-046-A	
55	Electrolytic capacitor 22,000μF 63V	ACH-046-0	(C1, C2)
56*	Front shield cover	ANH-231-B	
57	Top cover	ANE-072-A	
58*	Shield cover	ANH-232-A	
59	Fuse 1A (F4, lamp)	AEK-106-0	D
	Fuse 1A (F4, lamp)	AEK-402-0	GN
60	Fuse 1A (F2, F3, secondary)	AEK-106-0	D
	Fuse 1A (F2, F3, secondary)	AEK-402-0	GN
61	Power supply circuit assembly-2	AWR-070-B	D
	Power supply circuit assembly-2	AWR-088-0	GN
62	Volume circuit assembly	AWX-073-A	
63	Power transistor cover	ANE-073-B	
64*	Power amplifier block		Refer to P.24
65*	Side stay (R)	AND-080-A	
66*	Bottom plate	ANE-086-0	D
	Bottom plate	ANE-071-A	GN
67	Foot assembly	AEC-178-0	
68	Ground terminal 4P	K13-047-0	
69	Fuse 4A (F1, primary)	AEK-100-0	D
	Fuse 4A (F1, primary)	AEK-400-0	GN
70	Cord grommet	AEC-079-A	D
71	AC power cord	ADG-010-0	D
72*	Shield plate	ANH-247-0	

NOTICE: Any parts asterisked (*) are subject to being not supplied.

Key No.	Description	Part No.	
73*	Wire clip (S)	AEC-037-0	
74*	Lock plate	AEC-193-0	
75*	P.C. board mount metal	ANF-309-A	
76	Power supply circuit assembly-3	AWR-077-0	
77	Nut (insulator)	AEC-085-0	
78	Phono jack (MIC)	K72-020-0	
79	Washer (insulator)	E32-045-A	
80	Washer (insulator)	E34-004-0	
81	Relay (S17)	ASR-011-A	
82	Tapping screw 4x8	ABA-079-A	
83	Tapping screw 4x12	ABA-083-0	
84*	Socket mount metal	ANF-323-0	D
85*	AC socket cover plate	ANK-082-0	D
86*	Fuse cover plate	ANK-081-0	D
87	Line voltage selector socket	AKP-010-0	D
88	Line voltage selector plug	AKM-016-0	D

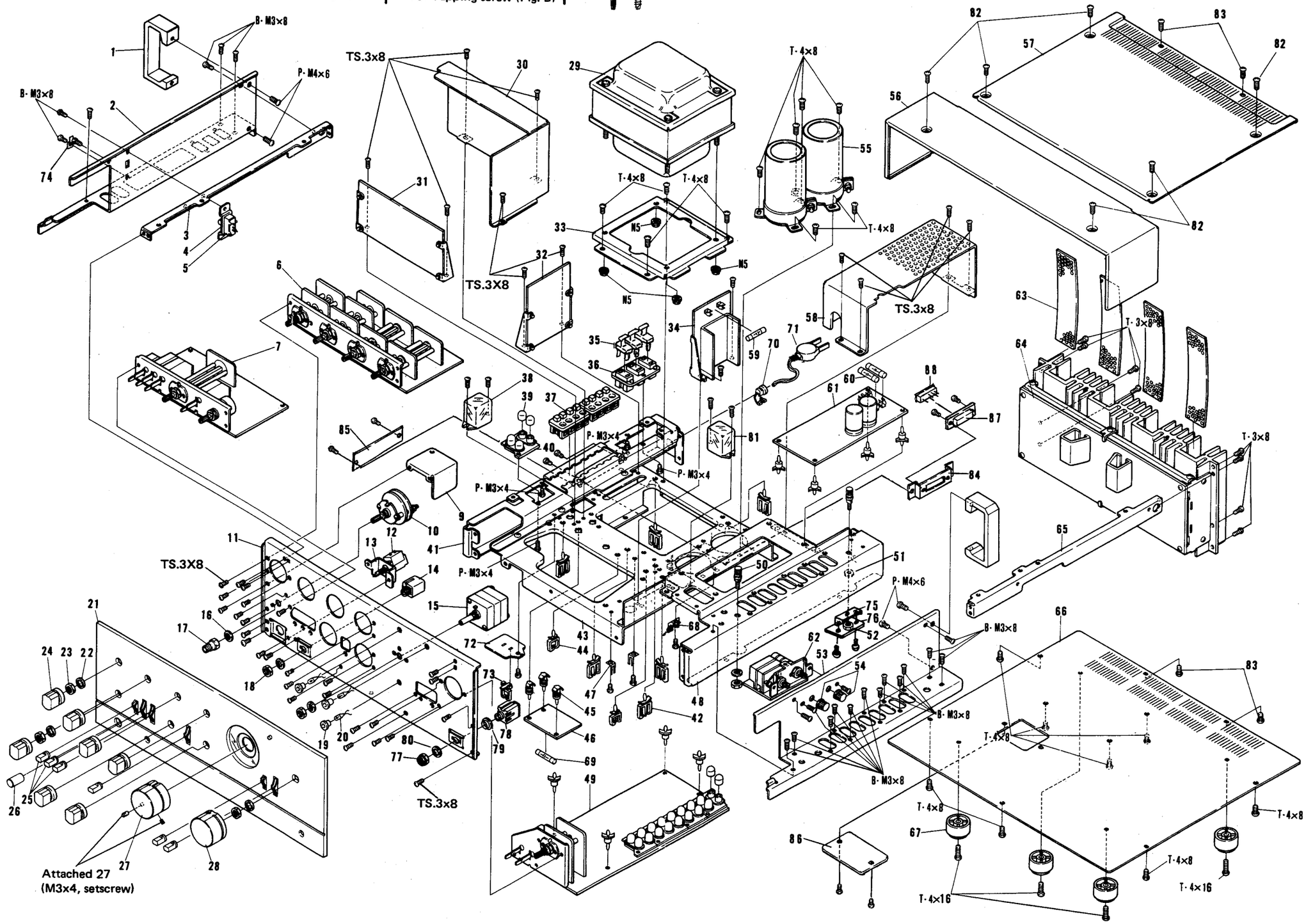
Key No. 64 Power Amplifier Block

NOTICE: Any parts asterisked (*) are subject to being not supplied.



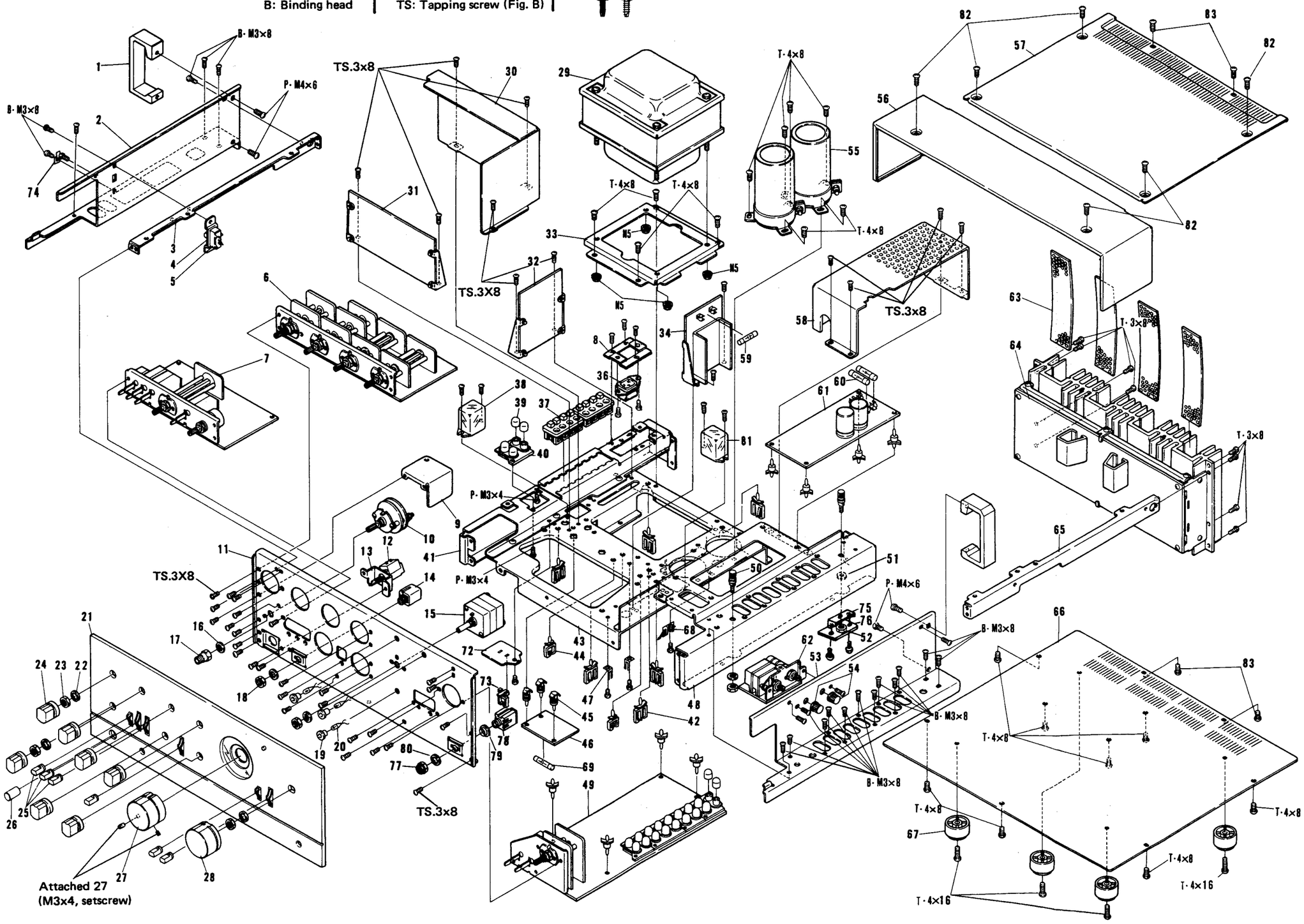
Exploded View (for D type)

Screws
P: Pan head
B: Binding head
T: Tapping screw (Fig. A)
TS: Tapping screw (Fig. B)



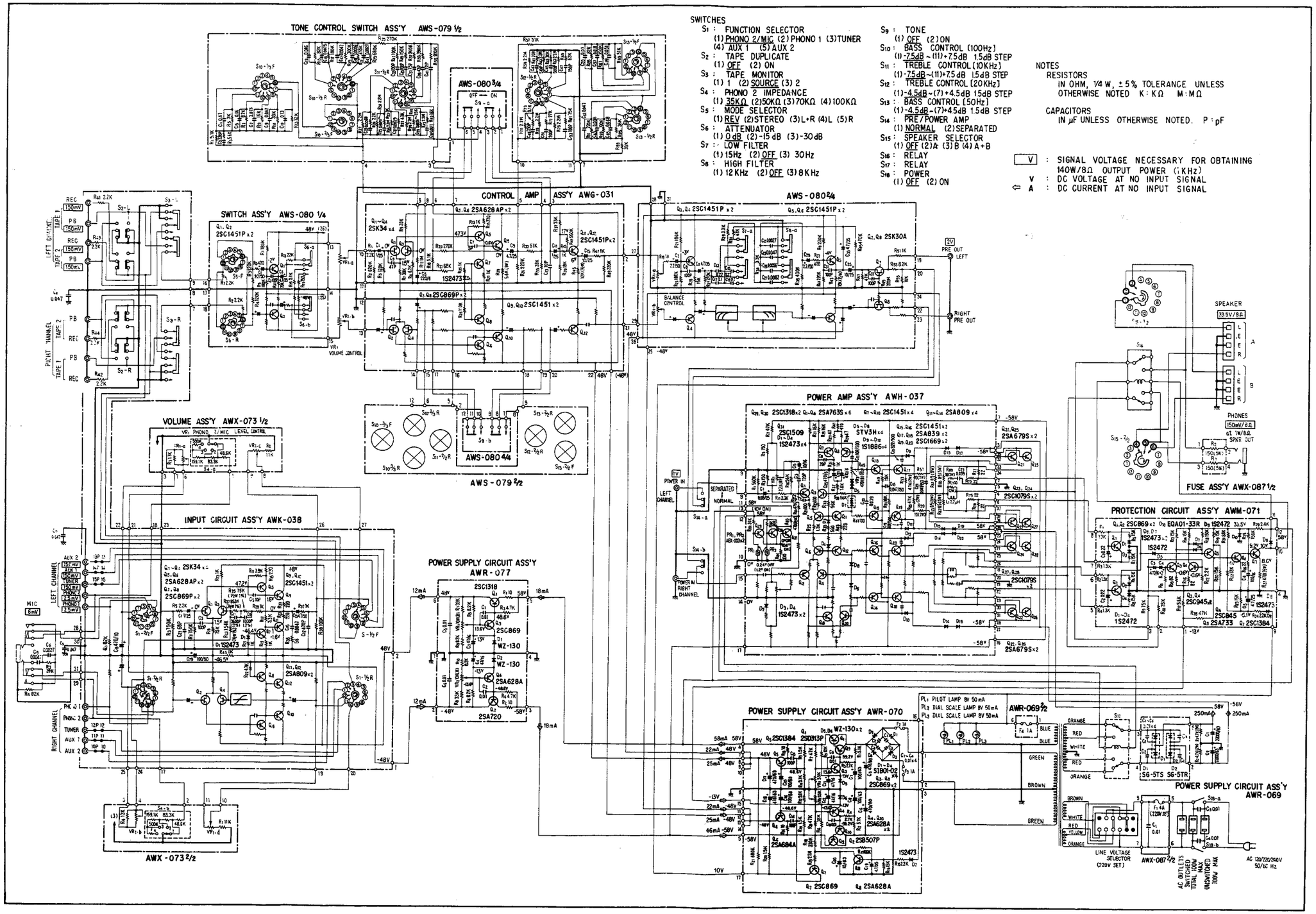
Exploded View (for GN type)

Screws
P: Pan head
B: Binding head
T: Tapping screw (Fig. A)
TS: Tapping screw (Fig. B)

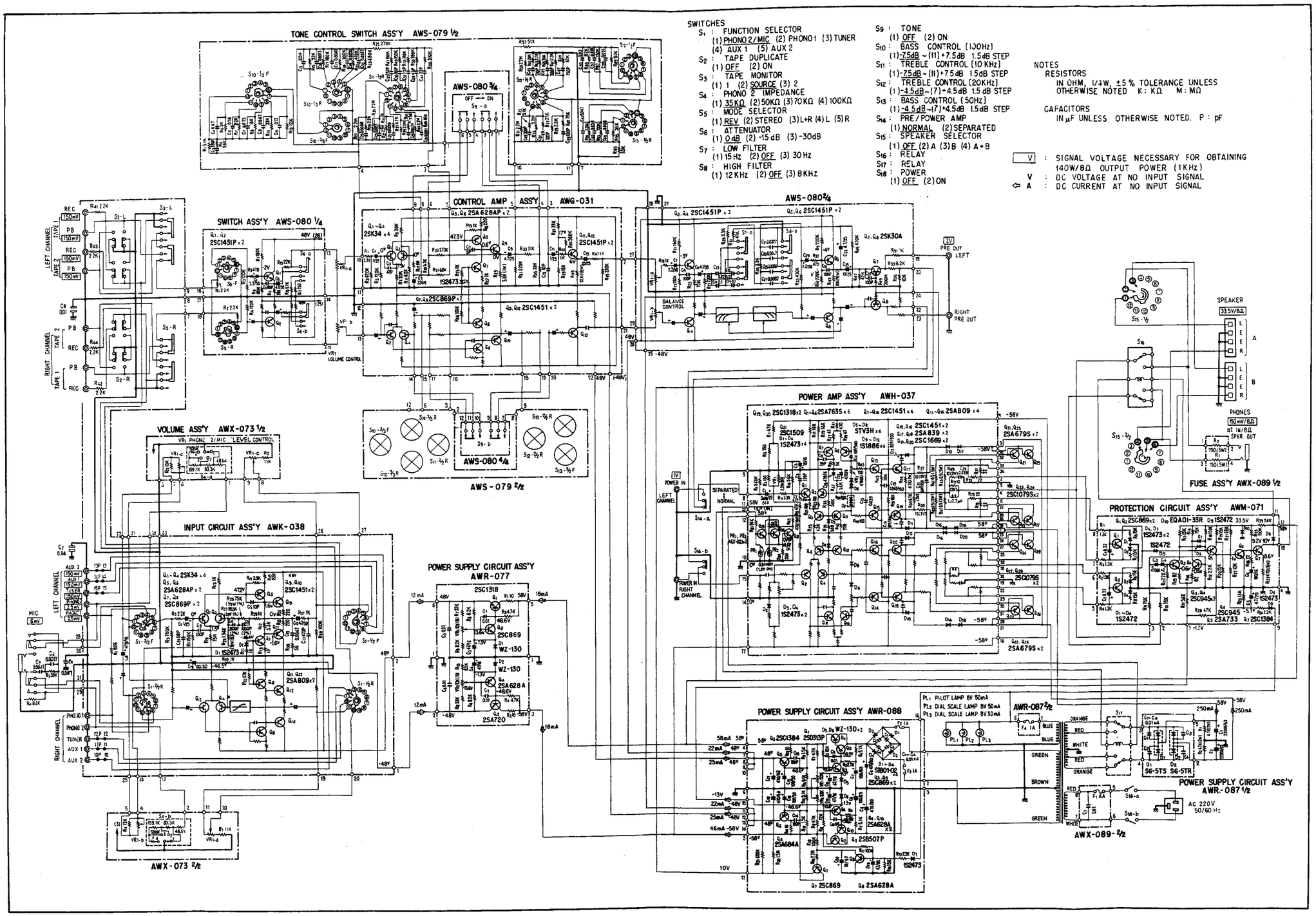


10. SCHEMATIC DIAGRAMS, P.C.BOARD PATTERNS AND PARTS LIST

10.1 SCHEMATIC DIAGRAM (D type)


TONE CONTROL SWITCH ASS'Y AWS-079 1/2
AWS-080 3/4
CONTROL AMP ASS'Y AWG-031
AWS-080 2/4
SWITCH ASS'Y AWS-080 1/4
VOLUME ASS'Y AWX-073 1/2
AWS-080 4/4
AWS-079 2/2
INPUT CIRCUIT ASS'Y AWK-038
AWX-073 2/2
POWER SUPPLY CIRCUIT ASS'Y AWR-077
POWER AMP ASS'Y AWH-037
POWER SUPPLY CIRCUIT ASS'Y AWR-070
AWR-069 2/2
SPEAKER
PHONES
FUSE ASS'Y AWX-087 1/2
PROTECTION CIRCUIT ASS'Y AWM-071
POWER SUPPLY CIRCUIT ASS'Y AWR-069
AWX-087 2/2
SWITCHES
S1 : FUNCTION SELECTOR
(1) PHONO 2/MIC (2) PHONO 1 (3) TUNER
(4) AUX 1 (5) AUX 2
S2 : TAPE DUPLICATE
(1) OFF (2) ON
S3 : TAPE MONITOR
(1) 1 (2) SOURCE (3) 2
S4 : PHONO 2 IMPEDANCE
(1) 35KΩ (2) 50KΩ (3) 70KΩ (4) 100KΩ
S5 : MODE SELECTOR
(1) REV (2) STEREO (3) L+R (4) L (5) R
S6 : ATTENUATOR
(1) 0 dB (2) -15 dB (3) -30 dB
S7 : LOW FILTER
(1) 15Hz (2) OFF (3) 30Hz
S8 : HIGH FILTER
(1) 12KHz (2) OFF (3) 8KHz
S9 : TONE
(1) OFF (2) ON
S10 : BASS CONTROL (100Hz)
(1) -7.5dB ~ (11) +7.5dB 1.5dB STEP
S11 : TREBLE CONTROL (10KHz)
(1) -7.5dB ~ (11) +7.5dB 1.5dB STEP
S12 : TREBLE CONTROL (20KHz)
(1) -4.5dB ~ (7) +4.5dB 1.5dB STEP
S13 : BASS CONTROL (50Hz)
(1) -4.5dB ~ (7) +4.5dB 1.5dB STEP
S14 : PRE/POWER AMP
(1) NORMAL (2) SEPARATED
S15 : SPEAKER SELECTOR
(1) OFF (2) A (3) B (4) A+B
S16 : RELAY
S17 : RELAY
S18 : POWER
(1) OFF (2) ON
NOTES
RESISTORS
IN OHM, 1/4 W, ±5% TOLERANCE UNLESS
OTHERWISE NOTED K : KΩ M : MΩ
CAPACITORS
IN μF UNLESS OTHERWISE NOTED. P : pF
V : SIGNAL VOLTAGE NECESSARY FOR OBTAINING
140W/8Ω OUTPUT POWER (1KHz)
V : DC VOLTAGE AT NO INPUT SIGNAL
A : DC CURRENT AT NO INPUT SIGNAL
PL1 PILOT LAMP 8V 50mA
PL2 DIAL SCALE LAMP 8V 50mA
PL3 DIAL SCALE LAMP 8V 50mA

10.2 SCHEMATIC DIAGRAM (GN type)


TONE CONTROL SWITCH ASS'Y AWS-079 1/2
AWS-080 3/4
CONTROL AMP ASS'Y AWG-031
SWITCH ASS'Y AWS-080 1/4
AWS-080 3/4
POWER AMP ASS'Y AWH-037
VOLUME ASS'Y AWX-073 1/2
AWS-079 2/2
INPUT CIRCUIT ASS'Y AWK-038
POWER SUPPLY CIRCUIT ASS'Y AWR-077
POWER SUPPLY CIRCUIT ASS'Y AWR-088
AWR-087 2/2
SPEAKER
PHONES
FUSE ASS'Y AWX-089 1/2
PROTECTION CIRCUIT ASS'Y AWM-071
POWER SUPPLY CIRCUIT ASS'Y AWR-087 1/2
AWX-089-2/2
AWX-073 2/2
SWITCHES
S1 : FUNCTION SELECTOR
(1) PHONO 2/MIC (2) PHONO 1 (3) TUNER
(4) AUX 1 (5) AUX 2
S2 : TAPE DUPLICATE
(1) OFF (2) ON
S3 : TAPE MONITOR
(1) 1 (2) SOURCE (3) 2
S4 : PHONO 2 IMPEDANCE
(1) 35KΩ (2) 50KΩ (3) 70KΩ (4) 100KΩ
S5 : MODE SELECTOR
(1) REV (2) STEREO (3) L+R (4) L (5) R
S6 : ATTENUATOR
(1) 0dB (2) -15dB (3) -30dB
S7 : LOW FILTER
(1) 15Hz (2) OFF (3) 30Hz
S8 : HIGH FILTER
(1) 12KHz (2) OFF (3) 8KHz
S9 : TONE
(1) OFF (2) ON
S10 : BASS CONTROL (100Hz)
(1) -7.5dB ~ (11) +7.5dB 1.5dB STEP
S11 : TREBLE CONTROL (10KHz)
(1) -7.5dB ~ (11) +7.5dB 1.5dB STEP
S12 : TREBLE CONTROL (20KHz)
(1) -4.5dB ~ (7) +4.5dB 1.5dB STEP
S13 : BASS CONTROL (50Hz)
(1) -4.5dB ~ (7) +4.5dB 1.5dB STEP
S14 : PRE/POWER AMP
(1) NORMAL (2) SEPARATED
S15 : SPEAKER SELECTOR
(1) OFF (2) A (3) B (4) A+B
S16 : RELAY
S17 : RELAY
S18 : POWER
(1) OFF (2) ON
NOTES
RESISTORS
IN OHM, 1/4W, ±5% TOLERANCE UNLESS OTHERWISE NOTED K: KΩ M: MΩ
CAPACITORS
IN μF UNLESS OTHERWISE NOTED. P : pF
[V] : SIGNAL VOLTAGE NECESSARY FOR OBTAINING 140W/8Ω OUTPUT POWER (1KHz)
V : DC VOLTAGE AT NO INPUT SIGNAL
⇦ A : DC CURRENT AT NO INPUT SIGNAL

10.3 ELECTRO-PARTS

• CAPACITORS: IN μF UNLESS OTHERWISE NOTED p: pF
•RESISTORS: INΩ, ¼W UNLESS OTHERWISE NOTED k: kΩ, M: MΩ

CAPACITORS

Symbol	Description	Part No.	
C1	Electrolytic 22,000 63V	ACH-046-0	
C2	Electrolytic 22,000 63V	ACH-046-0	
C3	Ceramic 0.01 250V	ACG-001-0	D
C4	Ceramic 0.01 250V	ACG-001-0	D
C5	Mylar 0.0047 50V	CQMA 472K 50	
C6	Mylar 0.0027 50V	CQMA 272K 50	
C7	Ceramic 0.047 25V	CKDBC 473Z 25	GN
C8	Ceramic 0.047 25V	CKDBC 473Z 25	GN

RESISTORS

Symbol	Description	Part No.	
R1	Metal oxide 4.7k 2W	RS2P 472J	
R2	Metal oxide 4.7k 2W	RS2P 472J	
R3	Carbon film 39k	RD¼PS 393J	
R4	Carbon film 82k	RD¼PS 823J	
VR2	Variable resistor 50k (VOLUME)	ACV-144-A	

SEMICONDUCTORS

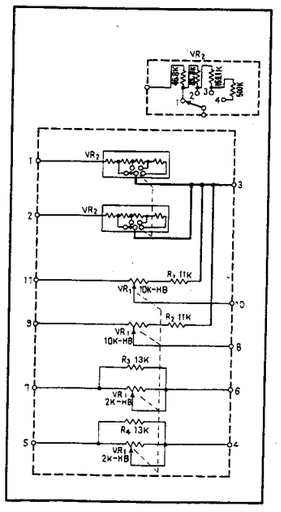
Symbol	Description	Part No.	
Q21	Transistor 2SA679S-Y or R (2SA747A-R, O or Y)		
Q22	Transistor 2SA679S-Y or R (2SA747A-R, O or Y)		
Q23	Transistor 2SC1079S-Y or R (2SC1116A-R, O or Y)		
Q24	Transistor 2SC1079S-Y or R (2SC1116A-R, O or Y)		
Q25	Transistor 2SA679S-Y or R (2SA747A-R, O or Y)		
Q26	Transistor 2SA679S-Y or R (2SA747A-R, O or Y)		
Q27	Transistor 2SC1079S-Y or R (2SC1116A-R, O or Y)		
Q28	Transistor 2SC1079S-Y or R (2SC1116A-R, O or Y)		

OTHERS

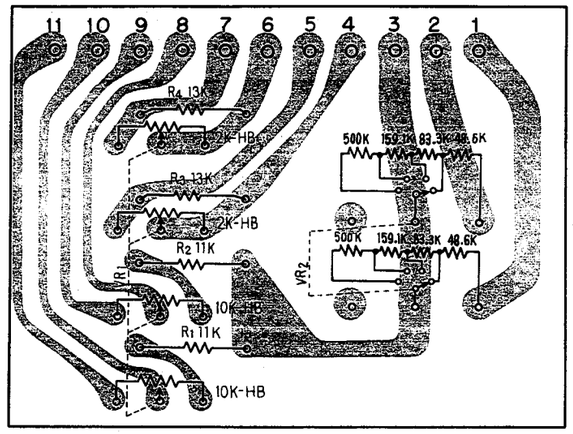
Symbol	Description	Part No.	
T1	Power transformer	ATT-239-0	D
	Power transformer	ATT-240-0	GN
S14	Slide switch (PRE/POWER AMP)	ASH-012-0	
S15	Rotary switch (SPEAKERS)	ASB-047-0	
S16	Relay	ASR-009-A	
S17	Relay	ASR-011-0	
S18	Push switch (POWER)	ASG-077-B	

Symbol	Description	Part No.	
F1	Fuse 4A	AEK-100-0	D
	Fuse 4A	AEK-400-0	GN
F2	Fuse 1A	AEK-106-0	D
	Fuse 1A	AEK-402-0	GN
F3	Fuse 1A	AEK-106-0	D
	Fuse 1A	AEK-402-0	GN
F4	Fuse 1A	AEK-106-0	D
	Fuse 1A	AEK-402-0	GN
PL1	Lamp, 8V 50mA, with leads (pilot)	AEL-022-0	
PL2	Lamp, 8V 50mA, with leads (scale)	AEL-022-0	
PL3	Lamp, 8V 50mA, with leads (scale)	AEL-022-0	

10.4 VOLUME CIRCUIT ASSEMBLY (AWX-073-A)



Foil Side

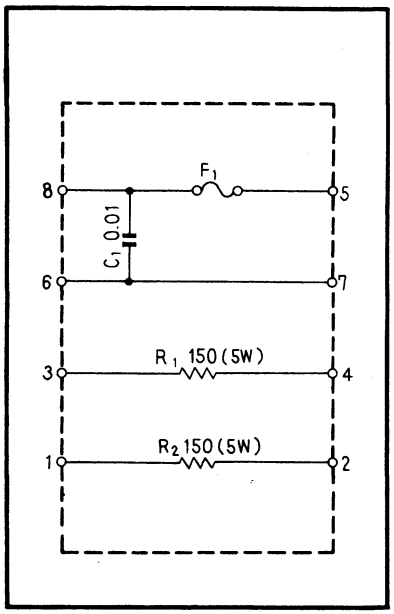


Parts List of Volume Circuit Assembly (AWX-073-A)

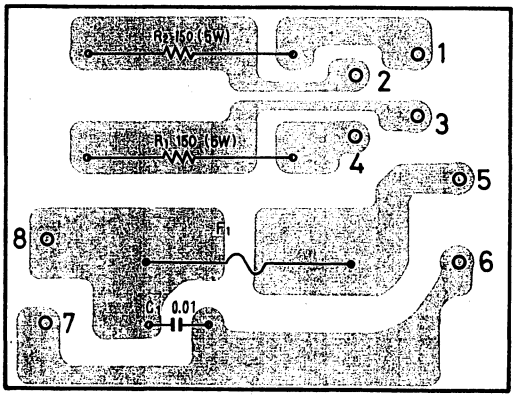
Symbol	Description	Part No.	
R1	Carbon film resistor 11k	RD¼PS 113J	
R2	Carbon film resistor 11k	RD¼PS 113J	
R3	Carbon film resistor 13k	RD¼PS 133J	
R4	Carbon film resistor 13k	RD¼PS 133J	
VR1	Variable resistor (PHONO 2/MIC LEVEL) 4 gang 2k-HB/10k-HB	ACT-304-0	
VR2	Impedance selector 233k (PHONO 2 IMPEDANCE)	ACV-146-A	

10.5 FUSE BOARD ASSEMBLY (AWX-087-0, AWX-089-0)

AWX-087: D type (3 line voltage)
AWX-089: GN type (220V only)



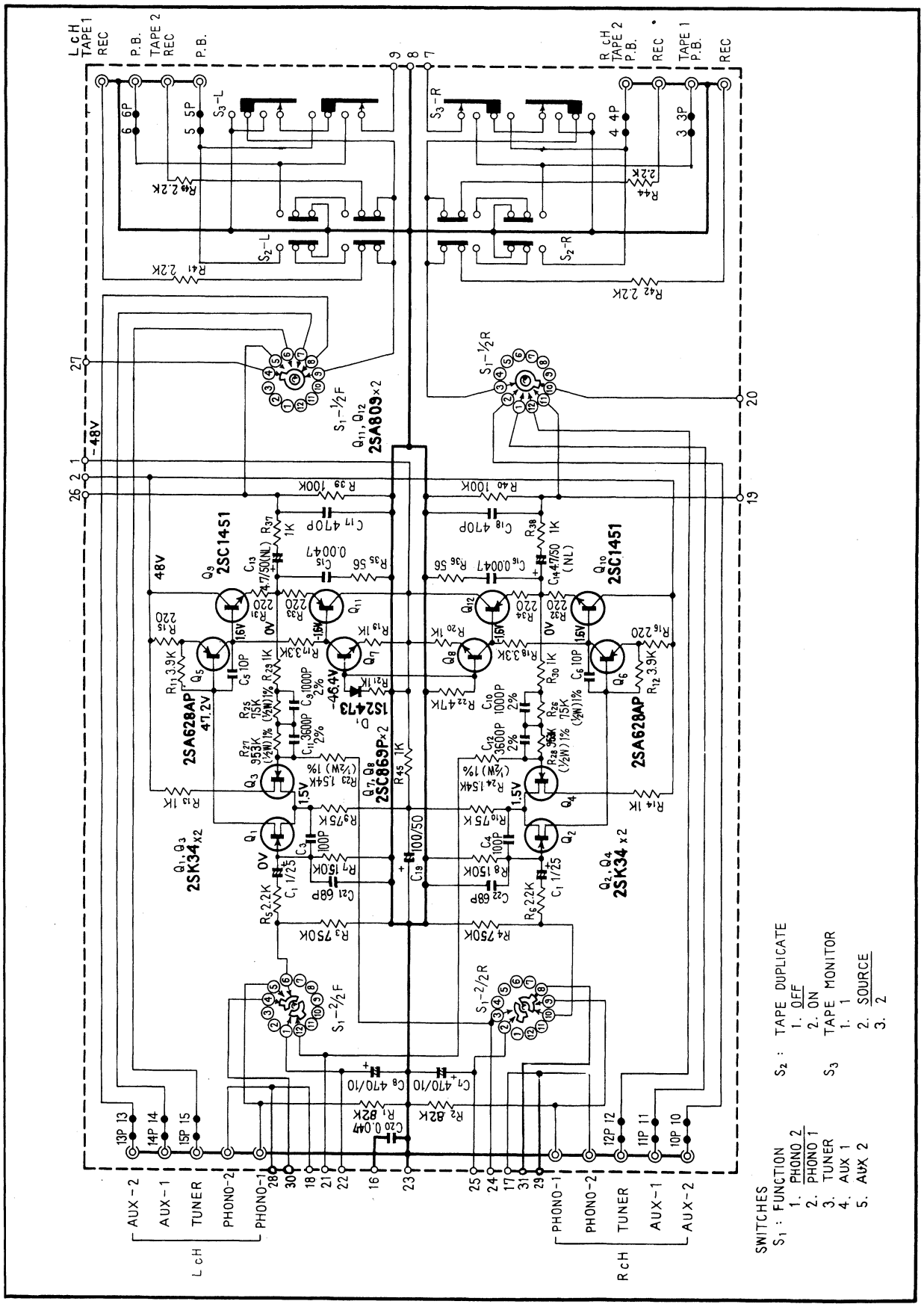
Foil side



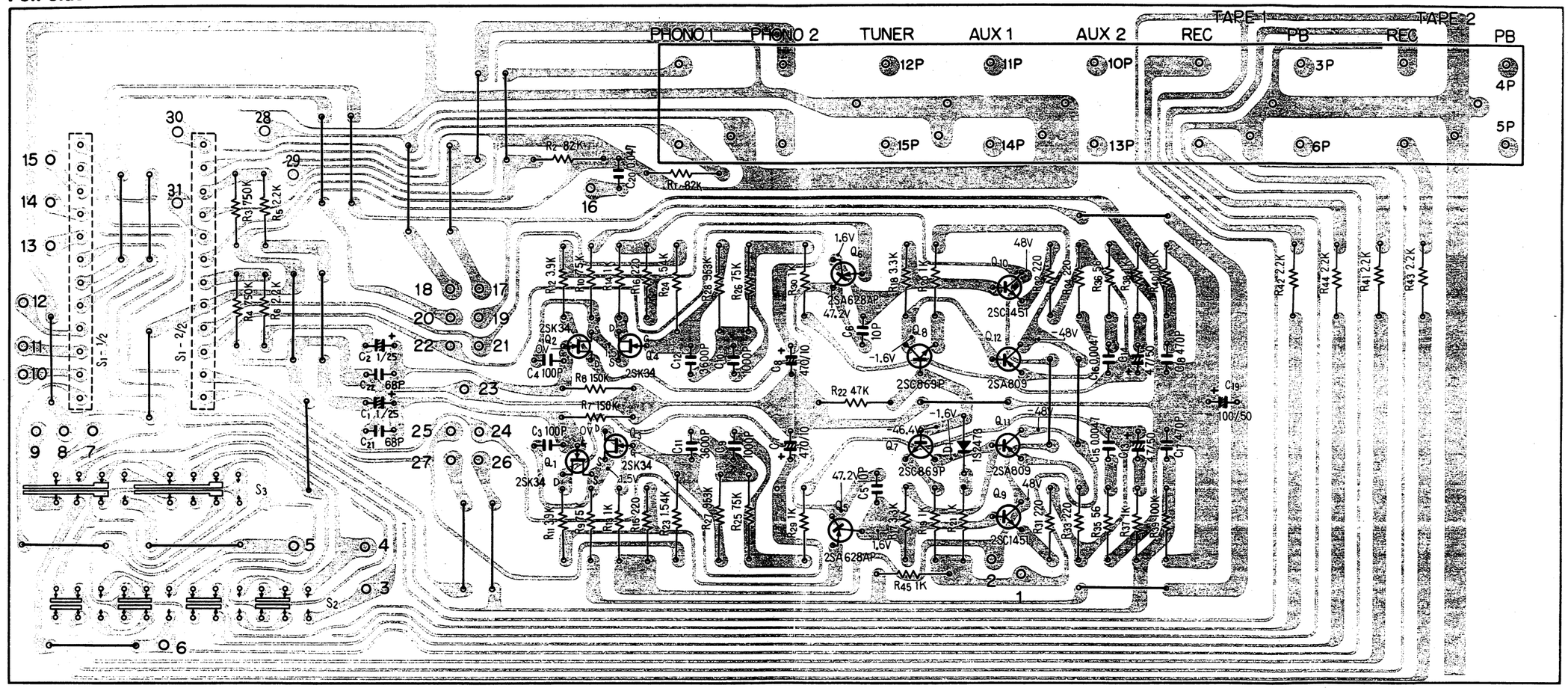
Parts List of Fuse Board Assembly (AWX-087-0, AWX-089-0)

Symbol	Description	Part No.	
R1	Wire wound resistor 150 5W	RT5B 151K	
R2	Wire wound resistor 150 5W	RT5B 151K	
C1	Ceramic capacitor 0.01 250V	ACG-001-0	
	Fuse clip	AKR-013-0	AWX-087 (D)
	Fuse clip	AKR-010-0	AWX-089 (GN)

10.6 INPUT CIRCUIT ASSEMBLY (AWK-038-C)



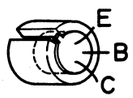
Foil Side



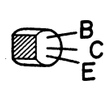
2SK34

2SA628AP
2SC869P

2SA809
2SC1451



(2SA763UL)



Parts List of Input Circuit Assembly (AWK-038-C)

CAPACITORS

Symbol	Description			Part No.	
C1	Electrolytic	1	25V	CSZA 010M 25	
C2	Electrolytic	1	25V	CSZA 010M 25	
C3	Ceramic	100p	50V	CKDYB 101K 50	
C4	Ceramic	100p	50V	CKDYB 101K 50	
C5	Ceramic	10p	50V	CCDSL 100F 50	
C6	Ceramic	10p	50V	CCDSL 100F 50	
C7	Electrolytic	470	10V	CEA 471P 10	
C8	Electrolytic	470	10V	CEA 471P 10	
C9	Styrol	1000p	50V	CQSA 102G 50	
C10	Styrol	1000p	50V	CQSA 102G 50	
C11	Styrol	3600p	50V	CQSA 362G 50	
C12	Styrol	3600p	50V	CQSA 362G 50	
C13	Electrolytic	4.7	50V	CEANL 4R7P 50	
C14	Electrolytic	4.7	50V	CEANL 4R7P 50	
C15	Mylar	0.0047	50V	CQMA 472J 50	
C16	Mylar	0.0047	50V	CQMA 472J 50	
C17	Ceramic	470p	50V	CKDYB 471K 50	
C18	Ceramic	470p	50V	CKDYB 471K 50	
C19	Electrolytic	100	50V	CEA 101P 50	
C20	Ceramic	0.047	25V	CKDBC 473Z 25	
C21	Ceramic	68p	50V	CCDSL 680K 50	
C22	Ceramic	68p	50V	CCDSL 680K 50	

RESISTORS

Symbol	Description		Part No.	
R1	Carbon film	100k	RD¼PS 104J	
R2	Carbon film	100k	RD¼PS 104J	
R3	Carbon film	620k	RD¼PS 624J	
R4	Carbon film	620k	RD¼PS 624J	
R5	Carbon film	2.2k	RD¼PS 222J	
R6	Carbon film	2.2k	RD¼PS 222J	
R7	Carbon film	120k	RD¼PS 124J	
R8	Carbon film	120k	RD¼PS 124J	
R9	Carbon film	75k	RD¼PS 753J NL	
R10	Carbon film	75k	RD¼PS 753J NL	
R11	Carbon film	3.9k	RD¼PS 392J	
R12	Carbon film	3.9k	RD¼PS 392J	
R13	Carbon film	1k	RD¼PS 102J	
R14	Carbon film	1k	RD¼PS 102J	
R15	Carbon film	220	RD¼PS 221J	
R16	Carbon film	220	RD¼PS 221J	
R17	Carbon film	3.2k	RD¼PS 332J	
R18	Carbon film	3.2k	RD¼PS 332J	
R19	Carbon film	1k	RD¼PS 102J	
R20	Carbon film	1k	RD¼PS 102J	

Symbol	Description			Part No.	
R21	Carbon film	1k		RD¼PS 102J	
R22	Carbon film	47k		RD¼PS 473J	
R23	Metal film	1.54k	½W	RN½SR 1541F	
R24	Metal film	1.54k	½W	RN½SR 1541F	
R25	Metal film	75k	½W	RN½SR 7502F	
R26	Metal film	75k	½W	RN½SR 7502F	
R27	Metal film	953k	½W	RN½SR 9533F	
R28	Metal film	953k	½W	RN½SR 9533F	
R29	Carbon film	1k		RD¼PS 102J	
R30	Carbon film	1k		RD¼PS 102J	
R31	Carbon film	220		RD¼PS 221J	
R32	Carbon film	220		RD¼PS 221J	
R33	Carbon film	220		RD¼PS 221J	
R34	Carbon film	220		RD¼PS 221J	
R35	Carbon film	56		RD¼PS 560J	
R36	Carbon film	56		RD¼PS 560J	
R37	Carbon film	1k		RD¼PS 102J	
R38	Carbon film	1k		RD¼PS 102J	
R39	Carbon film	100k		RD¼PS 104J	
R40	Carbon film	100k		RD¼PS 104J	
R41	Carbon film	2.2k		RD¼PS 222J	
R42	Carbon film	2.2k		RD¼PS 222J	
R43	Carbon film	2.2k		RD¼PS 222J	
R44	Carbon film	2.2k		RD¼PS 222J	
R45	Carbon film	1k		RD¼PS 102J	

SEMICONDUCTORS

Symbol	Description		Part No.	
Q1	FET	2SK34-D or C		
Q2	FET	2SK34-D or C		
Q3	FET	2SK34-D or C		
Q4	FET	2SK34-D or C		
Q5	Transistor	2SA628AP-D or C (2SA763UL-4)		
Q6	Transistor	2SA628AP-D or C (2SA763UL-4)		
Q7	Transistor	2SC869P-D or C		
Q8	Transistor	2SC869P-D or C		
Q9	Transistor	2SC145I-V, B or S		
Q10	Transistor	2SC145I-V, B or S		
Q11	Transistor	2SA809-V, B or		
Q12	Transistor	2SA809-V, B or		
D1	Diode	1S2473		

SWITCH

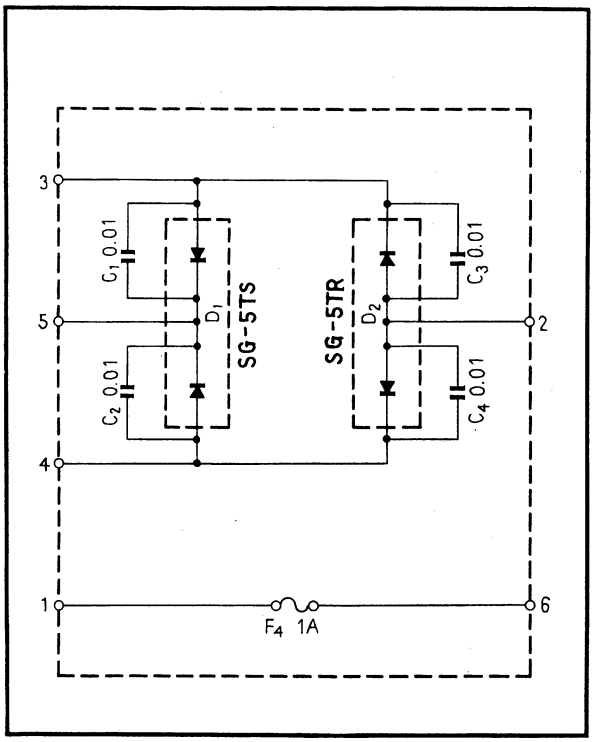
Symbol	Description	Part No.	
S1	Rotary switch (FUNCTION)	ASD-021-A	
S2	Lever switch (TAPE DUPLICATE)	ASK-084-A	
S3	Lever switch (TAPE MONITOR)	ASK-086-A	

OTHERS

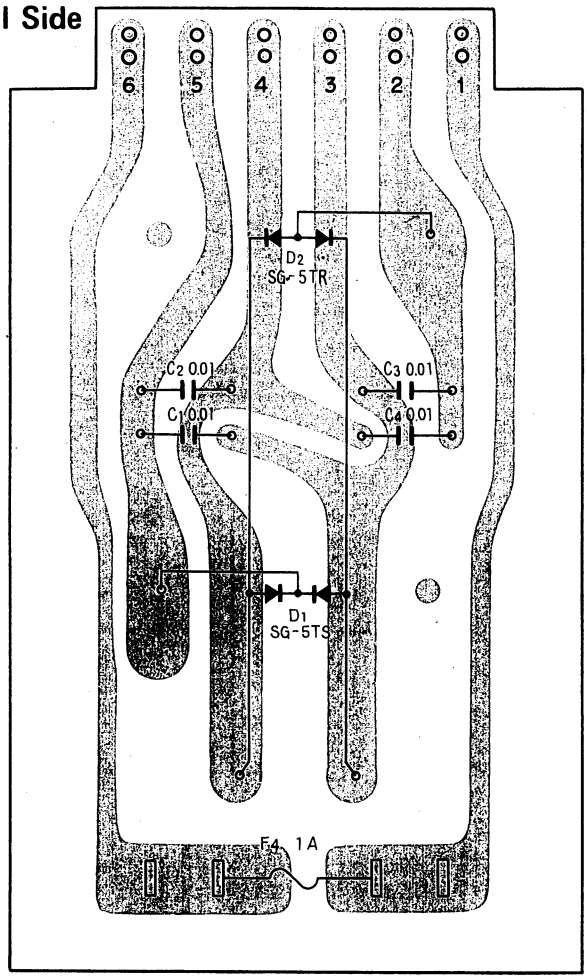
Symbol	Description	Part No.	
	Phono jack (4-jacks) Phono jack (6-jacks)	AKB-023-0 AKB-024-0	

10.7 POWER SUPPLY CIRCUIT ASSEMBLY-1 (AWR-069-B, AWR-087-0)

AWR-069: D type (3 line voltage)
AWR-087: GN type (220V only)



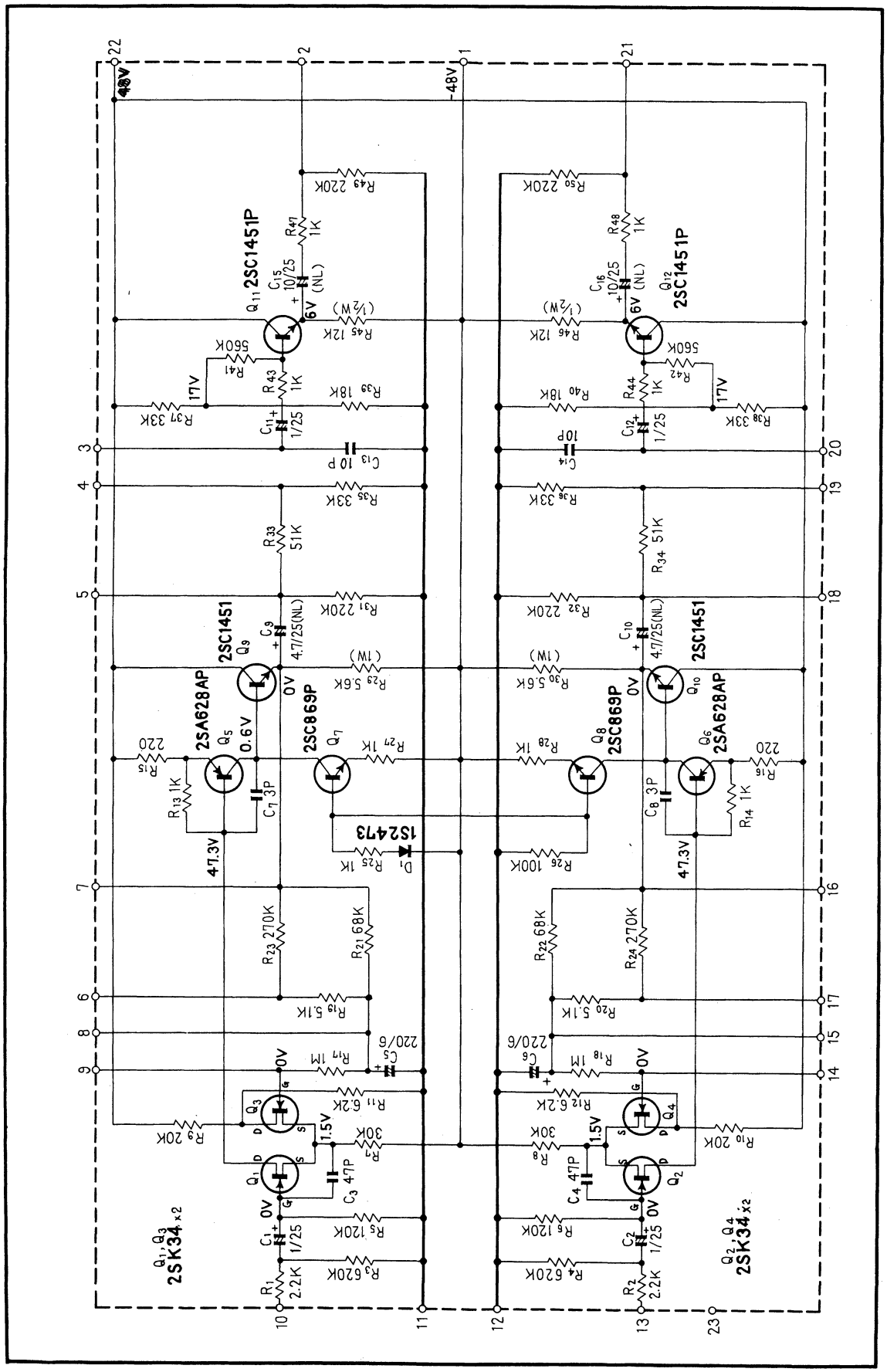
Foil Side



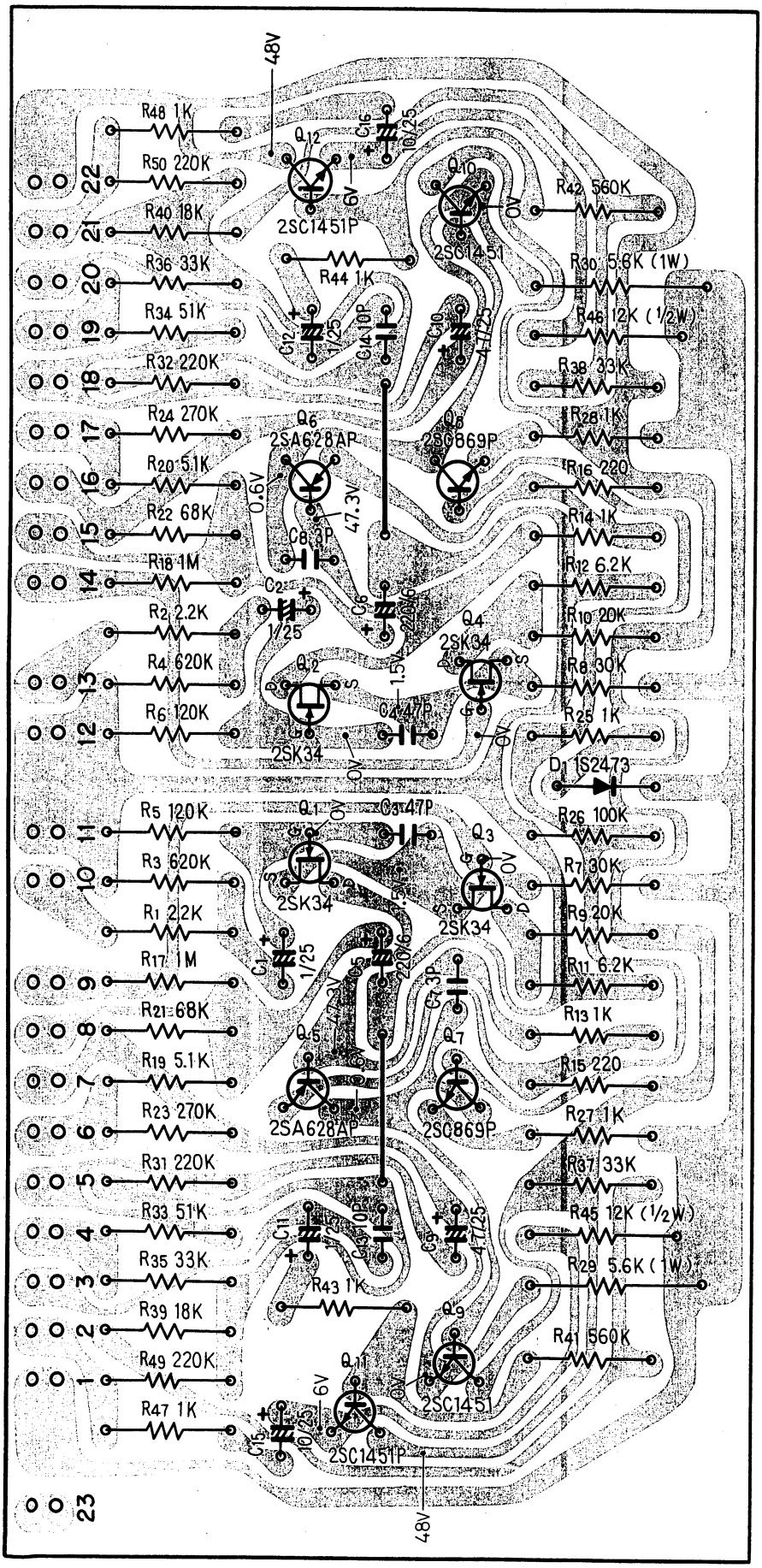
Parts List of Power Supply Circuit Assembly–1 (AWR-069-B, AWR-087-0)

Symbol	Description		Part No.	
C1	Ceramic capacitor 0.01	150V	ACG-004-0	
C2	Ceramic capacitor 0.01	150V	ACG-004-0	
C3	Ceramic capacitor 0.01	150V	ACG-004-0	
C4	Ceramic capacitor 0.01	150V	ACG-004-0	
D1	Diode	SG-5TS		
D2	Diode	SG-5TR		
	Heat sink		ANH-187-B	
	Jumper		ADX-006-A	
	Insulator water		AEC-076-0	
	Insulator bush		E32-047-0	
	Fuse clip		AKR-013-0	AWR-069(D)
	Fuse clip		AKR-010-0	AWR-087(GN)

10.8 CONTROL AMPLIFIER ASSEMBLY (AWG-031-0)



Foil Side



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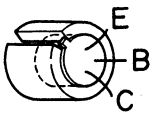

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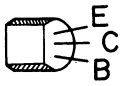


2SK34

Parts List of Control Amplifier Assembly (AWG-031-0)

CAPACITORS

Symbol	Description			Part No.	
C1	Electrolytic	1	35V	CSZA 010M 35	
C2	Electrolytic	1	35V	CSZA 010M 35	
C3	Ceramic	47p	50V	CCDSL 470K 50	
C4	Ceramic	47p	50V	CCDSL 470K 50	
C5	Electrolytic	220	6V	CEA 221P 6	
C6	Electrolytic	220	6V	CEA 221P 6	
C7	Ceramic	3p	50V	CCDSL 030C 50	
C8	Ceramic	3p	50V	CCDSL 030C 50	
C9	Electrolytic	4.7	25V	CEANL 4R7P 25	
C10	Electrolytic	4.7	25V	CEANL 4R7P 25	
C11	Electrolytic	1	35V	CSZA 010M 35	
C12	Electrolytic	1	35V	CSZA 010M 35	
C13	Ceramic	10p	50V	CCDSL 100F 50	
C14	Ceramic	10p	50V	CCDSL 100F 50	
C15	Electrolytic	10	25V	CEANL 100P 25	
C16	Electrolytic	10	25V	CEANL 100P 25	

RESISTORS

Symbol	Description		Part No.	
R1	Carbon film	2.2k	RD¼PS 222J	
R2	Carbon film	2.2k	RD¼PS 222J	
R3	Carbon film	620k	RD¼PS 624J	
R4	Carbon film	620k	RD¼PS 624J	
R5	Carbon film	120k	RD¼PS 124J	
R6	Carbon film	120k	RD¼PS 124J	
R7	Carbon film	30k	RD¼PS 303J	
R8	Carbon film	30k	RD¼PS 303J	
R9	Carbon film	20k	RD¼PS 203J	
R10	Carbon film	20k	RD¼PS 203J	
R11	Carbon film	6.2k	RD¼PS 622J	
R12	Carbon film	6.2k	RD¼PS 622J	
R13	Carbon film	1k	RD¼PS 102J	
R14	Carbon film	1k	RD¼PS 102J	
R15	Carbon film	220	RD¼PS 221J	
R16	Carbon film	220	RD¼PS 221J	
R17	Carbon film	1M	RD¼PS 105J	
R18	Carbon film	1M	RD¼PS 105J	
R19	Carbon film	5.1k	RD¼PS 512J	
R20	Carbon film	5.1k	RD¼PS 512J	
R21	Carbon film	68k	RD¼PS 683J	
R22	Carbon film	68k	RD¼PS 683J	
R23	Carbon film	270k	RD¼PS 274J	
R24	Carbon film	270k	RD¼PS 274J	
R25	Carbon film	1k	RD¼PS 102J	

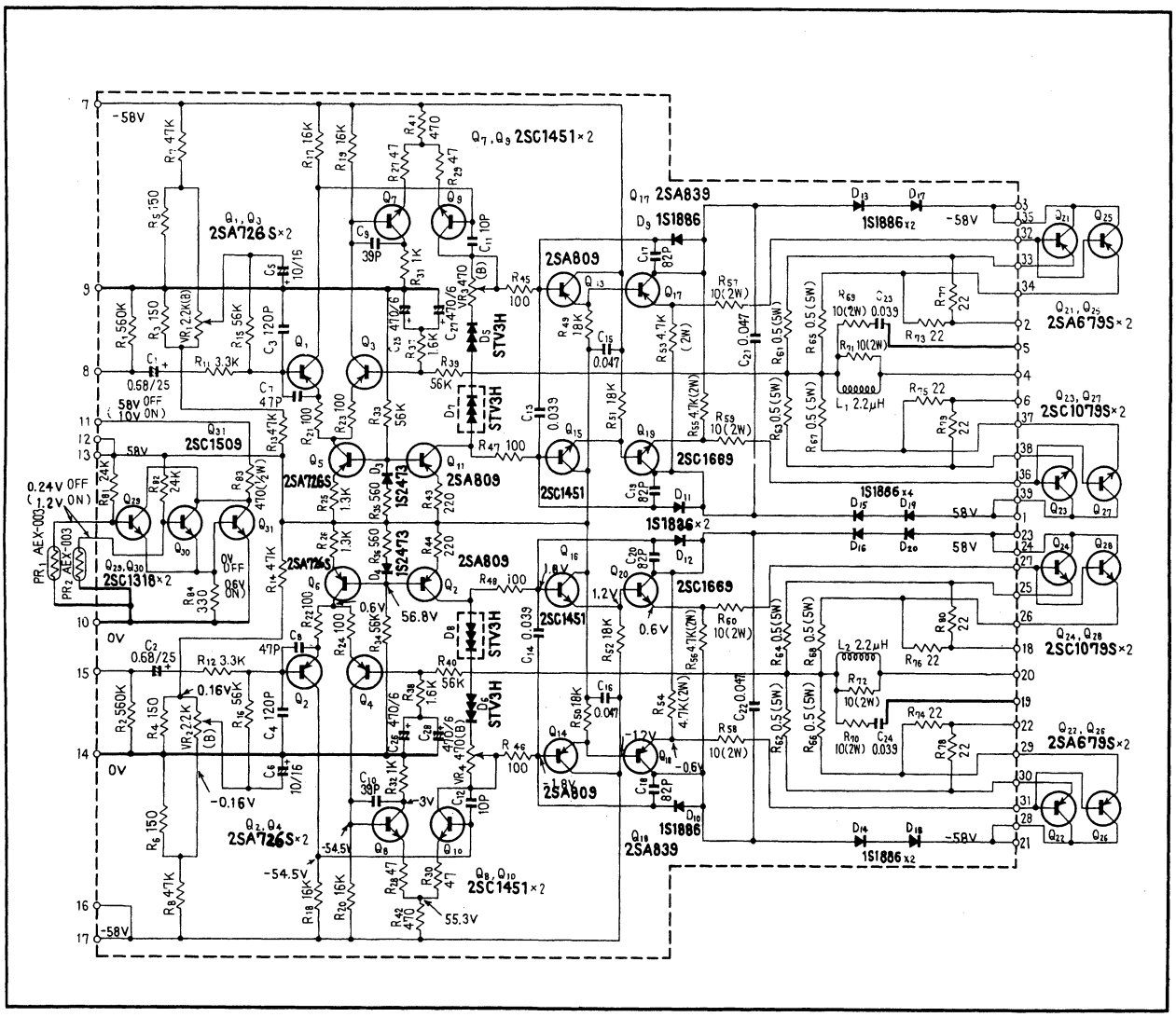
Symbol	Description			Part No.	
R26	Carbon film	100k		RD¼PS 104J	
R27	Carbon film	1k		RD¼PS 102J	
R28	Carbon film	1k		RD¼PS 102J	
R29	Metal oxide film	5.6k	1W	RS1P 562J	
R30	Metal oxide film	5.6k	1W	RS1P 562J	
R31	Carbon film	220k		RD¼PS 224J	
R32	Carbon film	220k		RD¼PS 224J	
R33	Carbon film	51k		RD¼PS 513J	
R34	Carbon film	51k		RD¼PS 513J	
R35	Carbon film	33k		RD¼PS 333J	
R36	Carbon film	33k		RD¼PS 333J	
R37	Carbon film	33k		RD¼PS 333J	
R38	Carbon film	33k		RD¼PS 333J	
R39	Carbon film	18k		RD¼PS 183J	
R40	Carbon film	18k		RD¼PS 183J	
R41	Carbon film	560k		RD¼PS 564J	
R42	Carbon film	560k		RD¼PS 564J	
R43	Carbon film	1k		RD¼PS 102J	
R44	Carbon film	1k		RD¼PS 102J	
R45	Carbon film	12k	½W	RD½PS 123J	
R46	Carbon film	12k	½W	RD½PS 123J	
R47	Carbon film	1k		RD¼PS 102J	
R48	Carbon film	1k		RD¼PS 102J	
R49	Carbon film	220k		RD¼PS 224J	
R50	Carbon film	220k		RD¼PS 224J	

SEMICONDUCTORS

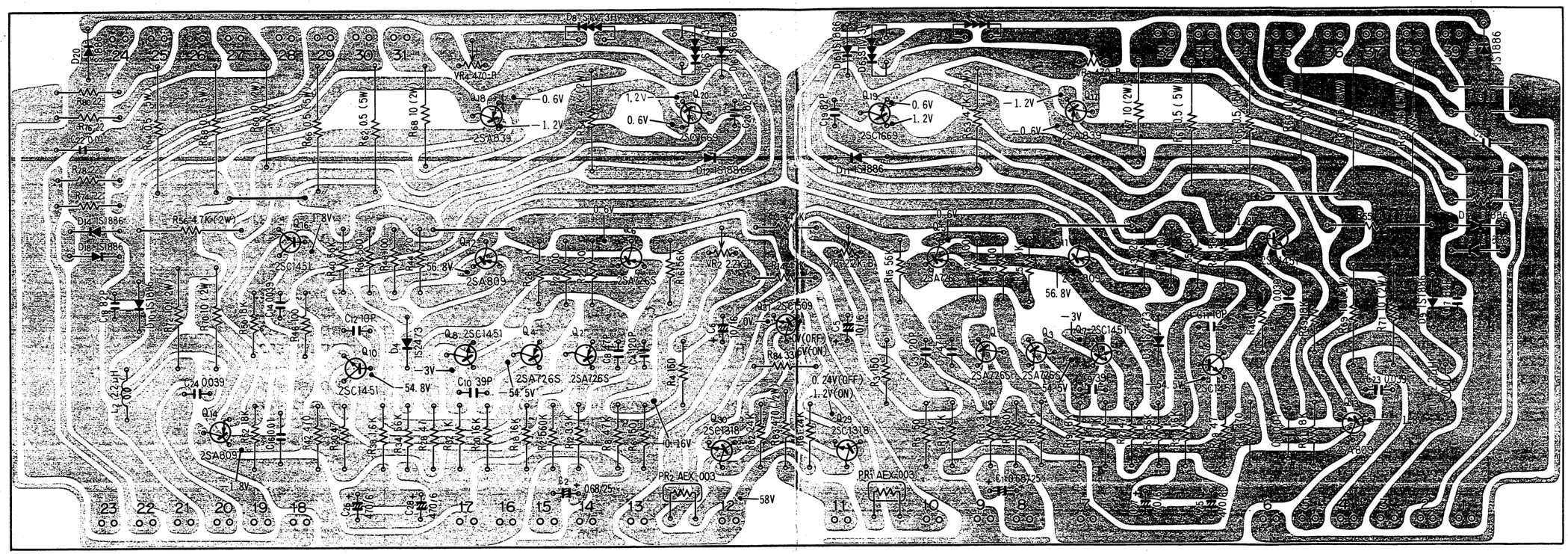
Symbol	Description		Part No.	
Q1	FET	2SK34-D or C		
Q2	FET	2SK34-D or C		
Q3	FET	2SK34-D or C		
Q4	FET	2SK34-D or C		
Q5	Transistor	2SA628AP-D or C		
Q6	Transistor	2SA628AP-D or C		
Q7	Transistor	2SC869P-D or C		
Q8	Transistor	2SC869P-D or C		
Q9	Transistor	2SC1451-B, V or S		
Q10	Transistor	2SC1451-B, V or S		
Q11	Transistor	2SC1451P-V or S		
Q12	Transistor	2SC1451P-V or S		
D1	Diode	1S2473		

10.9 POWER AMPLIFIER ASSEMBLY (AWH-037-A)

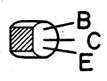
NOTE:
The power transistors (Q_{21}~Q_{28}) are excluded from parts of this assembly.



Foil Side



(2SA763S)



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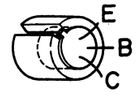
2SC1451
2SA809



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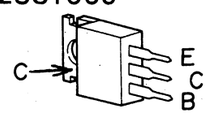

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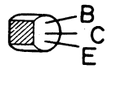

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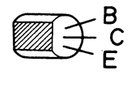


PION-02130/DRUCK15

Parts List of Power Amplifier Assembly (AWH-037-A)

CAPACITORS

Symbol	Description			Part No.	
C1	Electrolytic	0.68	25V	CSSA R68M 25	
C2	Electrolytic	0.68	25V	CSSA R68M 25	
C3	Ceramic	120p	50V	CCDSL 121K 50	
C4	Ceramic	120p	50V	CCDSL 121K 50	
C5	Electrolytic	10	16V	CEA 100P 16	
C6	Electrolytic	10	16V	CEA 100P 16	
C7	Ceramic	47p	50V	CCDSL 470K 50	
C8	Ceramic	47p	50V	CCDSL 470K 50	
C9	Ceramic	39p	50V	CCDSL 390K 50	
C10	Ceramic	39p	50V	CCDSL 390K 50	
C11	Ceramic	10p	500V	CCDSL 100K 500	
C12	Ceramic	10p	500V	CCDSL 100K 500	
C13	Mylar	0.039	50V	CQMA 393J 50	
C14	Mylar	0.039	50V	CQMA 393J 50	
C15	Ceramic	0.047	150V	ACG-009-0	
C16	Ceramic	0.047	150V	ACG-009-0	
C17	Ceramic	82p	500V	CCDSL 820K 500	
C18	Ceramic	82p	500V	CCDSL 820K 500	
C19	Ceramic	82p	500V	CCDSL 820K 500	
C20	Ceramic	82p	500V	CCDSL 820K 500	
C21	Ceramic	0.047	150V	ACG-009-0	
C22	Ceramic	0.047	150V	ACG-009-0	
C23	Mylar	0.039	50V	CQMA 393J 50	
C24	Mylar	0.039	50V	CQMA 393J 50	
C25	Electrolytic	470	6V	CEA 471P 6	
C26	Electrolytic	470	6V	CEA 471P 6	
C27	Electrolytic	470	6V	CEA 471P 6	
C28	Electrolytic	470	6V	CEA 471P 6	

RESISTORS

Symbol	Description		Part No.	
R1	Carbon film	560k	RD¼PS 564J	
R2	Carbon film	560k	RD¼PS 564J	
R3	Carbon film	150	RD¼PS 151J	
R4	Carbon film	150	RD¼PS 151J	
R5	Carbon film	150	RD¼PS 151J	
R6	Carbon film	150	RD¼PS 151J	
R7	Carbon film	47k	RD¼PS 473J	
R8	Carbon film	47k	RD¼PS 473J	
R9				
R10				
R11	Carbon film	3.3k	RD¼PS 332J	
R12	Carbon film	3.3k	RD¼PS 332J	
R13	Carbon film	47k	RD¼PS 473J	
R14	Carbon film	47k	RD¼PS 473J	
R15	Carbon film	56k	RD¼PS 563J	

Symbol	Description			Part No.	
R16	Carbon film	56k		RD¼PS 563J	
R17	Carbon film	16k		RD¼PS 163J	
R18	Carbon film	16k		RD¼PS 163J	
R19	Carbon film	16k		RD¼PS 163J	
R20	Carbon film	16k		RD¼PS 163J	
R21	Carbon film	100		RD¼PS 101J	
R22	Carbon film	100		RD¼PS 101J	
R23	Carbon film	100		RD¼PS 101J	
R24	Carbon film	100		RD¼PS 101J	
R25	Carbon film	1.3k		RD¼PS 132J	
R26	Carbon film	1.3k		RD¼PS 132J	
R27	Carbon film	47		RD¼PS 470J	
R28	Carbon film	47		RD¼PS 470J	
R29	Carbon film	47		RD¼PS 470J	
R30	Carbon film	47		RD¼PS 470J	
R31	Carbon film	1k		RD¼PS 102J	
R32	Carbon film	1k		RD¼PS 102J	
R33	Carbon film	56k		RD¼PS 563J	
R34	Carbon film	56k		RD¼PS 563J	
R35	Carbon film	560		RD¼PS 561J	
R36	Carbon film	560		RD¼PS 561J	
R37	Carbon film	1.6k		RD¼PS 162J	
R38	Carbon film	1.6k		RD¼PS 162J	
R39	Carbon film	56k		RD¼PS 563J	
R40	Carbon film	56k		RD¼PS 563J	
R41	Carbon film	470		RD¼PS 471J	
R42	Carbon film	470		RD¼PS 471J	
R43	Carbon film	220		RD¼PS 221J	
R44	Carbon film	220		RD¼PS 221J	
R45	Carbon film	100		RD¼PS 101J	
R46	Carbon film	100		RD¼PS 101J	
R47	Carbon film	100		RD¼PS 101J	
R48	Carbon film	100		RD¼PS 101J	
R49	Carbon film	18k		RD¼PS 183J	
R50	Carbon film	18k		RD¼PS 183J	
R51	Carbon film	18k		RD¼PS 183J	
R52	Carbon film	18k		RD¼PS 183J	
R53	Metal oxide film	4.7k	2W	RS2P 472J	
R54	Metal oxide film	4.7k	2W	RS2P 472J	
R55	Metal oxide film	4.7k	2W	RS2P 472J	
R56	Metal oxide film	4.7k	2W	RS2P 472J	
R57	Metal oxide film	10	2W	RS2P 100J	
R58	Metal oxide film	10	2W	RS2P 100J	
R59	Metal oxide film	10	2W	RS2P 100J	
R60	Metal oxide film	10	2W	RS2P 100J	
R61	Wire wound	0.5	5W	RT5B 0R5K	
R62	Wire wound	0.5	5W	RT5B 0R5K	
R63	Wire wound	0.5	5W	RT5B 0R5K	
R64	Wire wound	0.5	5W	RT5B 0R5K	
R65	Wire wound	0.5	5W	RT5B 0R5K	

PION-02130/DRUCK16

Symbol	Description			Part No.	
R66	Wire wound	0.5	5W	RT5B 0R5K	
R67	Wire wound	0.5	5W	RT5B 0R5K	
R68	Wire wound	0.5	5W	RT5B 0R5K	
R69	Metal oxide film	10	2W	RS2P 100J	
R70	Metal oxide film	10	2W	RS2P 100J	
R71	Metal oxide film	10	2W	RS2P 100J	
R72	Metal oxide film	10	2W	RS2P 100J	
R73	Carbon film	22		RD¼PS 220J	
R74	Carbon film	22		RD¼PS 220J	
R75	Carbon film	22		RD¼PS 220J	
R76	Carbon film	22		RD¼PS 220J	
R77	Carbon film	22		RD¼PS 220J	
R78	Carbon film	22		RD¼PS 220J	
R79	Carbon film	22		RD¼PS 220J	
R80	Carbon film	22		RD¼PS 220J	
R81	Carbon film	24k		RD¼PS 243J	
R82	Carbon film	24k		RD¼PS 243J	
R83	Carbon film	470	½W	RD½PS 471J	
R84	Carbon film	330		RD¼PS 331J	
VR1	Semi-fixed	2.2k-B		ACP-041-A	
VR2	Semi-fixed	2.2k-B		ACP-041-A	
VR3	Semi-fixed	470-B		ACP-040-A	
VR4	Semi-fixed	470-B		ACP-040-A	

SEMICONDUCTORS

Symbol	Description		Part No.	
Q1	Transistor	2SA726S-G or F (2SA763S-6 or 5)		
Q2	Transistor	2SA726S-G or F (2SA763S-6 or 5)		
Q3	Transistor	2SA726S-G or F (2SA763S-6 or 5)		
Q4	Transistor	2SA726S-G or F (2SA763S-6 or 5)		
Q5	Transistor	2SA726S-G or F (2SA763S-6 or 5)		
Q6	Transistor	2SA726S-G or F (2SA763S- 6 or 5)		
Q7	Transistor	2SC1451-V or B		
Q8	Transistor	2SC1451-V or B		
Q9	Transistor	2SC1451-V or B		
Q10	Transistor	2SC1451-V or B		
Q11	Transistor	2SA809-V, B or G		
Q12	Transistor	2SA809-V, B or G		
Q13	Transistor	2SA809-V, B or G		
Q14	Transistor	2SA809-V, B or G		
Q15	Transistor	2SC1451-V, B or G		

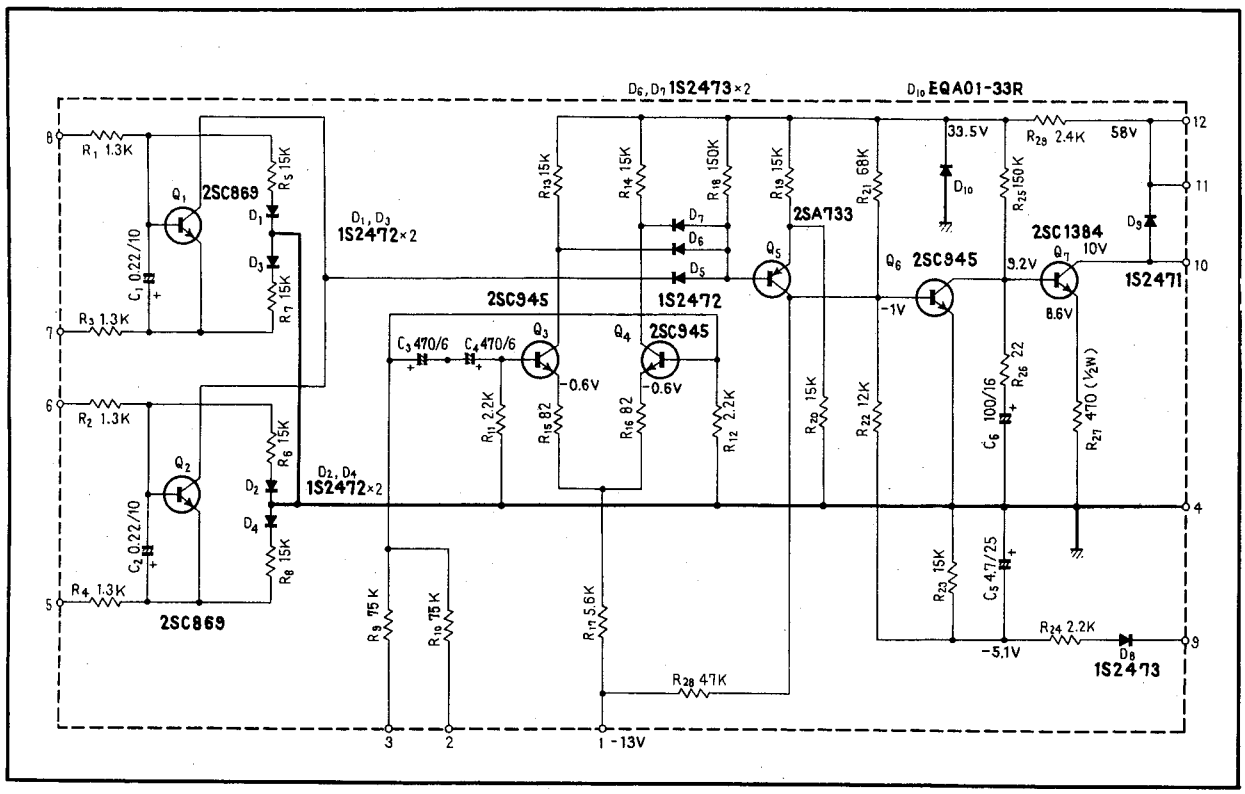
Continued on the Next Page

Symbol	Description		Part No.	
Q16	Transistor	2SC1451-V, B or G		
Q17	Transistor	2SA839-Y, O or R		
Q18	Transistor	2SA839-Y, O or R		
Q19	Transistor	2SC1669-Y, O or R		
Q20	Transistor	2SC1669-Y, O or R		
Q29	Transistor	2SC1318-R or Q		
Q30	Transistor	2SC1318-R or Q		
Q31	Transistor	2SC1509-R or Q		
PR1	Posistor		AEX-003-0	
PR2	Posistor		AEX-003-0	
D3	Diode	1S2473		
D4	Diode	1S2473		
D5	Varistor	STV-3H		
D6	Varistor	STV-3H		
D7	Varistor	STV-3H		
D8	Varistor	STV-3H		
D9	Diode	1S 1886 (SIB01-02)		
D10	Diode	1S 1886 (SIB01-02)		
D11	Diode	1S 1886 (SIB01-02)		
D12	Diode	1S 1886 (SIB01-02)		
D13	Diode	1S 1886 (SIB01-02)		
D14	Diode	1S 1886 (SIB01-02)		
D15	Diode	1S 1886 (SIB01-02)		
D16	Diode	1S 1886 (SIB01-02)		
D17	Diode	1S 1886 (SIB01-02)		
D18	Diode	1S 1886 (SIB01-02)		
D19	Diode	1S 1886 (SIB01-02)		
D20	Diode	1S 1886 (SIB01-02)		

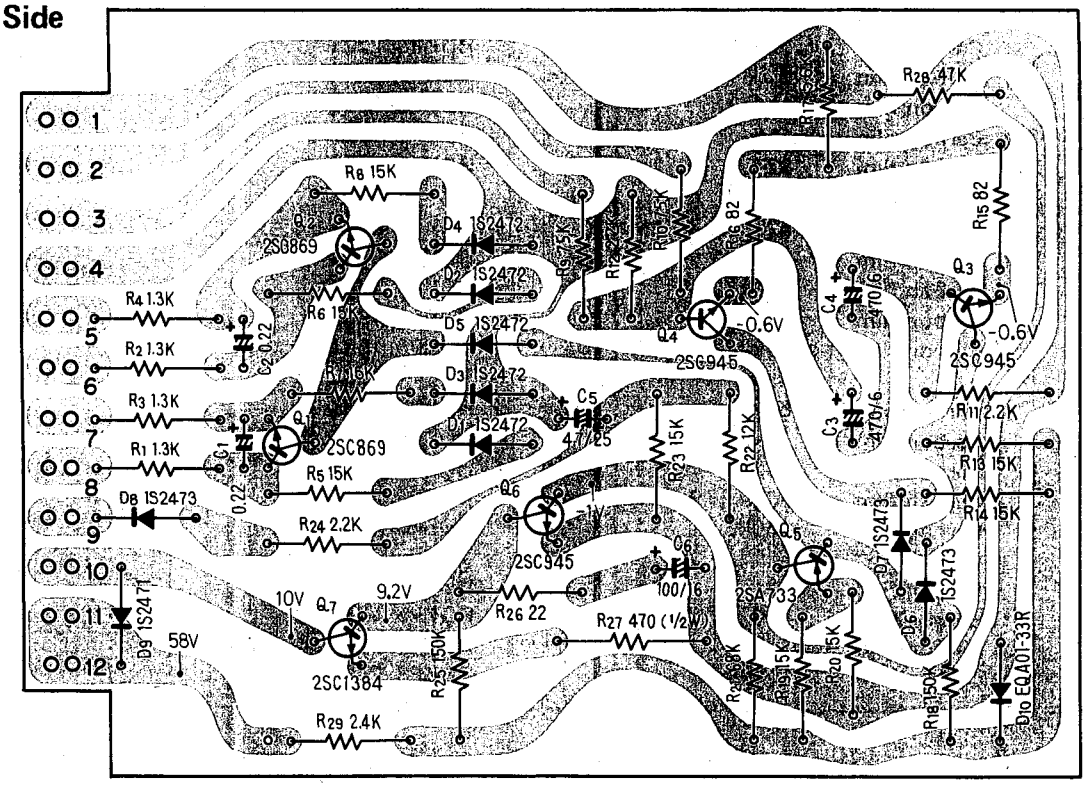
OTHERS

Symbol	Description		Part No.	
	Heat sink		ANH-237-0	
	Transistor socket		AKH-002-0	
	Insulator wafer		AEC-078-0	
	Spacer		ANG-108-0	
L1	Choke coil	2.2μH	T63-009-0	
L2	Choke coil	2.2μH	T63-009-0	

10.10 PROTECTION CIRCUIT ASSEMBLY (AWM-071-0)



Foil Side



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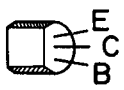
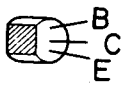


2SC945
2SA733



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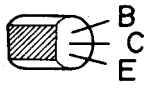


Parts List of Protection Circuit Assembly (AWM-071-0)

CAPACITORS

Symbol	Description			Part No.	
C1	Electrolytic	0.22	10V	CSSA R22M 10	
C2	Electrolytic	0.22	10V	CSSA R22M 10	
C3	Electrolytic	470	6V	CEA 471P 6	
C4	Electrolytic	470	6V	CEA 471P 6	
C5	Electrolytic	4.7	25V	CEA 4R7P 25	
C6	Electrolytic	100	16V	CEA 101P 16	

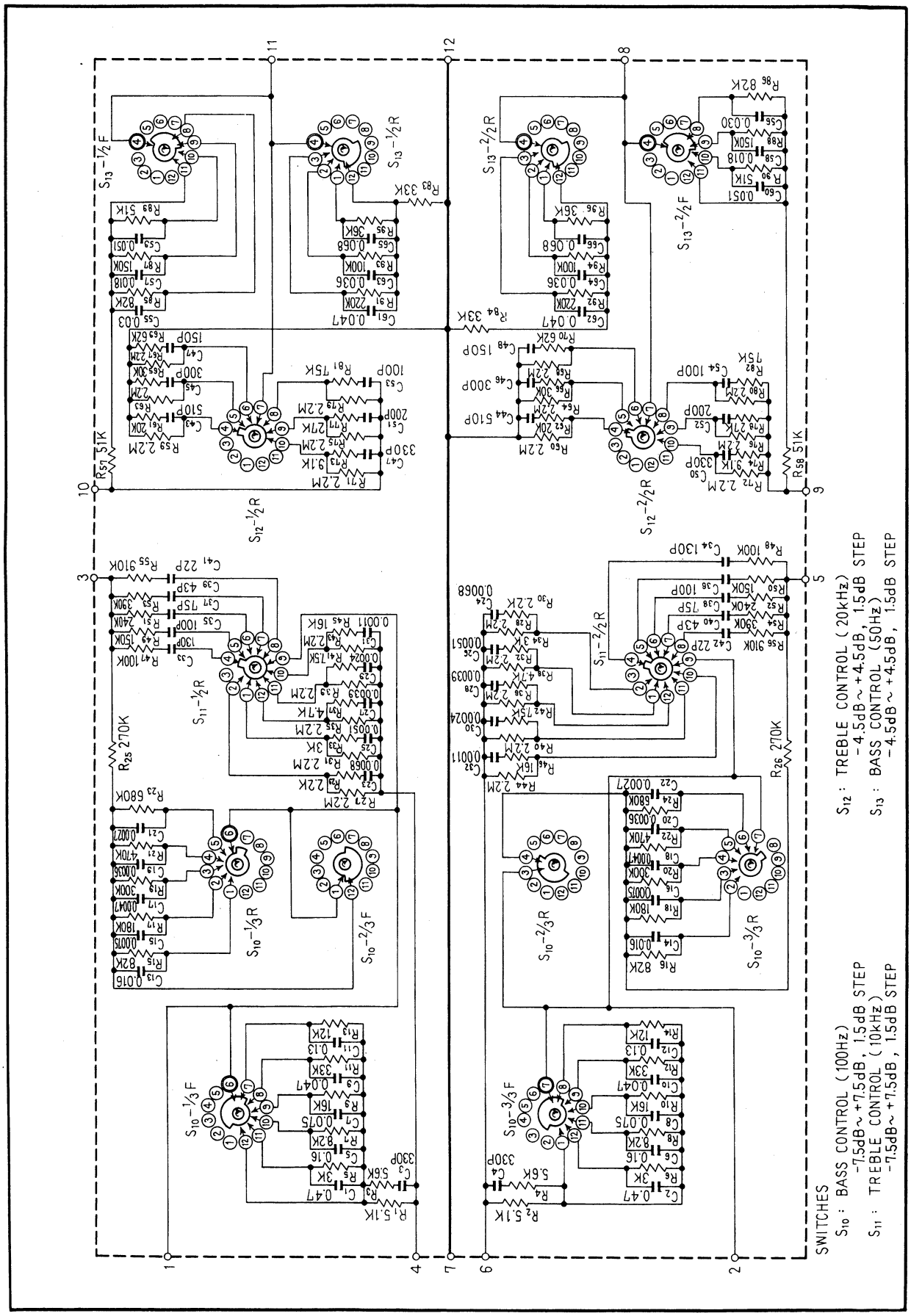
RESISTORS

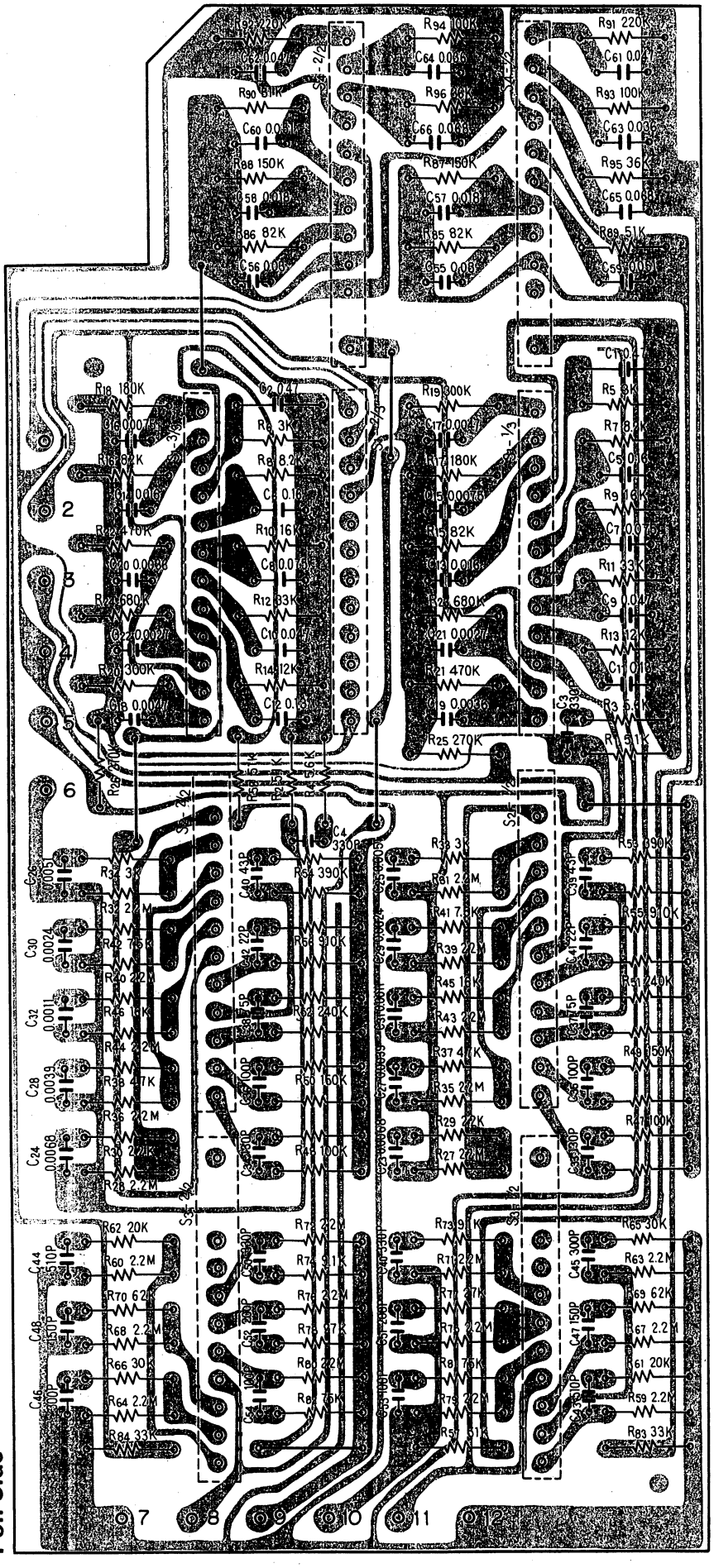
Symbol	Description		Part No.	
R1	Carbon film	1.3k	RD¼PS 132J	
R2	Carbon film	1.3k	RD¼PS 132J	
R3	Carbon film	1.3k	RD¼PS 132J	
R4	Carbon film	1.3k	RD¼PS 132J	
R5	Carbon film	15k	RD¼PS 153J	
R6	Carbon film	15k	RD¼PS 153J	
R7	Carbon film	15k	RD¼PS 153J	
R8	Carbon film	15k	RD¼PS 153J	
R9	Carbon film	75k	RD¼PS 753J	
R10	Carbon film	75k	RD¼PS 753J	
R11	Carbon film	2.2k	RD¼PS 222J	
R12	Carbon film	2.2k	RD¼PS 222J	
R13	Carbon film	15k	RD¼PS 153J	
R14	Carbon film	15k	RD¼PS 153J	
R15	Carbon film	82	RD¼PS 820J	
R16	Carbon film	82	RD¼PS 820J	
R17	Carbon film	5.6k	RD¼PS 562J	
R18	Carbon film	150k	RD¼PS 154J	
R19	Carbon film	15k	RD¼PS 153J	
R20	Carbon film	15k	RD¼PS 153J	
R21	Carbon film	68k	RD¼PS 683J	
R22	Carbon film	12k	RD¼PS 123J	
R23	Carbon film	15k	RD¼PS 153J	
R24	Carbon film	2.2k	RD¼PS 222J	
R25	Carbon film	150k	RD¼PS 154J	
R26	Carbon film	22	RD¼PS 220J	
R27	Carbon film	470 ½W	RD½PS 471J	
R28	Carbon film	47k	RD¼PS 473J	
R29	Carbon film	2.4k	RD¼PS 242J	

SEMICONDUCTORS

Symbol	Description		Part No.	
Q1	Transistor	2SC869-C or D		
Q2	Transistor	2SC869-C or D		
Q3	Transistor	2SC945-Q or R		
Q4	Transistor	2SC945-Q or R		
Q5	Transistor	2SA733-Q or R		
Q6	Transistor	2SC945-Q or R		
Q7	Transistor	2SC1384-R or Q		
D1	Diode	1S2472 (1S1554)		
D2	Diode	1S2472 (1S1554)		
D3	Diode	1S2472 (1S1554)		
D4	Diode	1S2472 (1S1554)		
D5	Diode	1S2472 (1S1554)		
D6	Diode	1S2473 (1S1555)		
D7	Diode	1S2473 (1S1555)		
D8	Diode	1S2473 (1S1555)		
D9	Diode	1S2471		
D10	Zener diode	EQA01-33R		

10.11 TONE SWITCH CIRCUIT ASSEMBLY (AWS-079-0)


SWITCHES
S10 : BASS CONTROL (100Hz)
-7.5dB ~ +7.5dB, 1.5dB STEP
S11 : TREBLE CONTROL (10kHz)
-7.5dB ~ +7.5dB, 1.5dB STEP
S12 : TREBLE CONTROL (20kHz)
-4.5dB ~ +4.5dB, 1.5dB STEP
S13 : BASS CONTROL (50Hz)
-4.5dB ~ +4.5dB, 1.5dB STEP



Foil Side

Parts List of Tone Switch Circuit Assembly (AWS-079-0)

CAPACITORS

Symbol	Description			Part No.	
C1	Mylar	0.47	50V	CQMA 474K 50	
C2	Mylar	0.47	50V	CQMA 474K 50	
C3	Ceramic	330p	50V	CKDYB 331K 50	
C4	Ceramic	330p	50V	CKDYB 331K 50	
C5	Mylar	0.16	50V	CQMA 164J 50	
C6	Mylar	0.16	50V	CQMA 164J 50	
C7	Mylar	0.075	50V	CQMA 753J 50	
C8	Mylar	0.075	50V	CQMA 753J 50	
C9	Mylar	0.047	50V	CQMA 473J 50	
C10	Mylar	0.047	50V	CQMA 473J 50	
C11	Mylar	0.13	50V	CQMA 134J 50	
C12	Mylar	0.13	50V	CQMA 134J 50	
C13	Mylar	0.016	50V	CQMA 163J 50	
C14	Mylar	0.016	50V	CQMA 163J 50	
C15	Mylar	0.0075	50V	CQMA 752J 50	
C16	Mylar	0.0075	50V	CQMA 752J 50	
C17	Mylar	0.0047	50V	CQMA 472J 50	
C18	Mylar	0.0047	50V	CQMA 472J 50	
C19	Mylar	0.0036	50V	CQMA 362J 50	
C20	Mylar	0.0036	50V	CQMA 362J 50	
C21	Mylar	0.0027	50V	CQMA 272J 50	
C22	Mylar	0.0027	50V	CQMA 272J 50	
C23	Mylar	0.0068	50V	CQMA 682J 50	
C24	Mylar	0.0068	50V	CQMA 682J 50	
C25	Mylar	0.0051	50V	CQMA 512J 50	
C26	Mylar	0.0051	50V	CQMA 512J 50	
C27	Mylar	0.0039	50V	CQMA 392J 50	
C28	Mylar	0.0039	50V	CQMA 392J 50	
C29	Mylar	0.0024	50V	CQMA 242J 50	
C30	Mylar	0.0024	50V	CQMA 242J 50	
C31	Mylar	0.0011	50V	CQMA 112J 50	
C32	Mylar	0.0011	50V	CQMA 112J 50	
C33	Styrol	130p	50V	CQSA 131J 50	
C34	Styrol	130p	50V	CQSA 131J 50	
C35	Styrol	100p	50V	CQSA 101J 50	
C36	Styrol	100p	50V	CQSA 101J 50	
C37	Styrol	75p	50V	CQSA 750J 50	
C38	Styrol	75p	50V	CQSA 750J 50	
C39	Styrol	43p	50V	CQSA 430J 50	
C40	Styrol	43p	50V	CQSA 430J 50	
C41	Styrol	22p	50V	CQSA 220J 50	
C42	Styrol	22p	50V	CQSA 220J 50	
C43	Styrol	510p	50V	CQSA 511J 50	
C44	Styrol	510p	50V	CQSA 511J 50	
C45	Styrol	300p	50V	CQSA 301J 50	

Symbol	Description			Part No.	
C46	Styrol	300p	50V	CQSA 301J 50	
C47	Styrol	150p	50V	CQSA 151J 50	
C48	Styrol	150p	50V	CQSA 151J 50	
C49	Styrol	330p	50V	CQSA 331J 50	
C50	Styrol	330p	50V	CQSA 331J 50	
C51	Styrol	200p	50V	CQSA 201J 50	
C52	Styrol	200p	50V	CQSA 201J 50	
C53	Styrol	100p	50V	CQSA 101J 50	
C54	Styrol	100p	50V	CQSA 101J 50	
C55	Mylar	0.03	50V	CQMA 303J 50	
C56	Mylar	0.03	50V	CQMA 303J 50	
C57	Mylar	0.018	50V	CQMA 183J 50	
C58	Mylar	0.018	50V	CQMA 183J 50	
C59	Mylar	0.051	50V	CQMA 513J 50	
C60	Mylar	0.051	50V	CQMA 513J 50	
C61	Mylar	0.047	50V	CQMA 473J 50	
C62	Mylar	0.047	50V	CQMA 473J 50	
C63	Mylar	0.036	50V	CQMA 363J 50	
C64	Mylar	0.036	50V	CQMA 363J 50	
C65	Mylar	0.068	50V	CQMA 683J 50	
C66	Mylar	0.068	50V	CQMA 683J 50	

RESISTORS

Symbol	Description		Part No.	
R1	Carbon film	5.1k	RD¼PS 512J	
R2	Carbon film	5.1k	RD¼PS 512J	
R3	Carbon film	5.6k	RD¼PS 562J	
R4	Carbon film	5.6k	RD¼PS 562J	
R5	Carbon film	3k	RD¼PS 302J	
R6	Carbon film	3k	RD¼PS 302J	
R7	Carbon film	8.2k	RD¼PS 822J	
R8	Carbon film	8.2k	RD¼PS 822J	
R9	Carbon film	16k	RD¼PS 163J	
R10	Carbon film	16k	RD¼PS 163J	
R11	Carbon film	33k	RD¼PS 333J	
R12	Carbon film	33k	RD¼PS 333J	
R13	Carbon film	12k	RD¼PS 123J	
R14	Carbon film	12k	RD¼PS 123J	
R15	Carbon film	82k	RD¼PS 823J	
R16	Carbon film	82k	RD¼PS 823J	
R17	Carbon film	180k	RD¼PS 184J	
R18	Carbon film	180k	RD¼PS 184J	
R19	Carbon film	300k	RD¼PS 304J	
R20	Carbon film	300k	RD¼PS 304J	
R21	Carbon film	470k	RD¼PS 474J	
R22	Carbon film	470k	RD¼PS 474J	
R23	Carbon film	680k	RD¼PS 684J	
R24	Carbon film	680k	RD¼PS 684J	
R25	Carbon film	270k	RD¼PS 274J	

Continued on the Next Page

Symbol	Description		Part No.	
R26	Carbon film	270k	RD¼PS 274J	
R27	Carbon film	2.2M	RD¼PS 225J	
R28	Carbon film	2.2M	RD¼PS 225J	
R29	Carbon film	2.2k	RD¼PS 222J	
R30	Carbon film	2.2k	RD¼PS 222J	
R31	Carbon film	2.2M	RD¼PS 225J	
R32	Carbon film	2.2M	RD¼PS 225J	
R33	Carbon film	3k	RD¼PS 302J	
R34	Carbon film	3k	RD¼PS 302J	
R35	Carbon film	2.2M	RD¼PS 225J	
R36	Carbon film	2.2M	RD¼PS 225J	
R37	Carbon film	4.7k	RD¼PS 472J	
R38	Carbon film	4.7k	RD¼PS 472J	
R39	Carbon film	2.2M	RD¼PS 225J	
R40	Carbon film	2.2M	RD¼PS 225J	
R41	Carbon film	7.5k	RD¼PS 752J	
R42	Carbon film	7.5k	RD¼PS 752J	
R43	Carbon film	2.2M	RD¼PS 225J	
R44	Carbon film	2.2M	RD¼PS 225J	
R45	Carbon film	16k	RD¼PS 163J	
R46	Carbon film	16k	RD¼PS 163J	
R47	Carbon film	100k	RD¼PS 104J	
R48	Carbon film	100k	RD¼PS 104J	
R49	Carbon film	150k	RD¼PS 154J	
R50	Carbon film	150k	RD¼PS 154J	
R51	Carbon film	240k	RD¼PS 244J	
R52	Carbon film	240k	RD¼PS 244J	
R53	Carbon film	390k	RD¼PS 394J	
R54	Carbon film	390k	RD¼PS 394J	
R55	Carbon film	910k	RD¼PS 914J	
R56	Carbon film	910k	RD¼PS 914J	
R57	Carbon film	51k	RD¼PS 513J	
R58	Carbon film	51k	RD¼PS 513J	
R59	Carbon film	2.2M	RD¼PS 225J	
R60	Carbon film	2.2M	RD¼PS 225J	
R61	Carbon film	20k	RD¼PS 203J	
R62	Carbon film	20k	RD¼PS 203J	
R63	Carbon film	2.2M	RD¼PS 225J	
R64	Carbon film	2.2M	RD¼PS 225J	
R65	Carbon film	30k	RD¼PS 303J	
R66	Carbon film	30k	RD¼PS 303J	
R67	Carbon film	2.2M	RD¼PS 225J	
R68	Carbon film	2.2M	RD¼PS 225J	
R69	Carbon film	62k	RD¼PS 623J	
R70	Carbon film	62k	RD¼PS 623J	
R71	Carbon film	2.2M	RD¼PS 225J	
R72	Carbon film	2.2M	RD¼PS 225J	
R73	Carbon film	9.1k	RD¼PS 912J	
R74	Carbon film	9.1k	RD¼PS 912J	
R75	Carbon film	2.2M	RD¼PS 225J	

Parts List of Tone Switch Circuit Assembly

Symbol	Description		Part No.	
R76	Carbon film	2.2M	RD¼PS 225J	
R77	Carbon film	27k	RD¼PS 273J	
R78	Carbon film	27k	RD¼PS 273J	
R79	Carbon film	2.2M	RD¼PS 225J	
R80	Carbon film	2.2M	RD¼PS 225J	
R81	Carbon film	75k	RD¼PS 753J	
R82	Carbon film	75k	RD¼PS 753J	
R83	Carbon film	33k	RD¼PS 333J	
R84	Carbon film	33k	RD¼PS 333J	
R85	Carbon film	82k	RD¼PS 823J	
R86	Carbon film	82k	RD¼PS 823J	
R87	Carbon film	150k	RD¼PS 154J	
R88	Carbon film	150k	RD¼PS 154J	
R89	Carbon film	51k	RD¼PS 513J	
R90	Carbon film	51k	RD¼PS 513J	
R91	Carbon film	220k	RD¼PS 224J	
R92	Carbon film	220k	RD¼PS 224J	
R93	Carbon film	100k	RD¼PS 104J	
R94	Carbon film	100k	RD¼PS 104J	
R95	Carbon film	36k	RD¼PS 363J	
R96	Carbon film	36k	RD¼PS 363J	

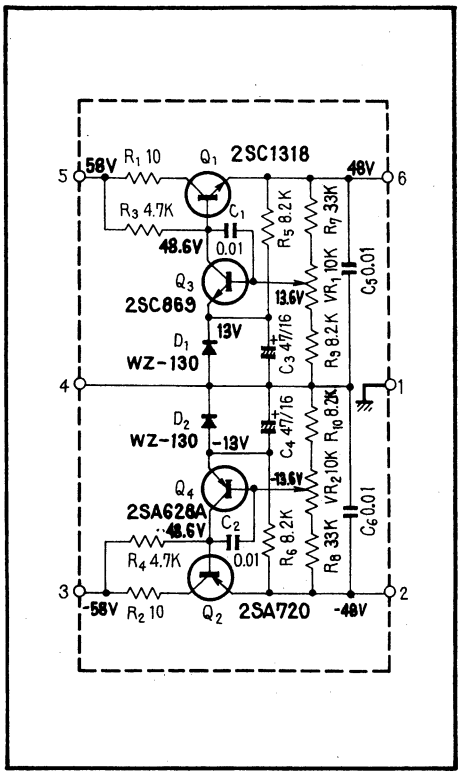
SWITCHES

Symbol	Description	Part No.	
S1	Rotary switch (BASS, 100Hz)	ASD-023-C	
S2	Rotary switch (TREBLE, 10kHz)	ASD-024-B	
S3	Rotary switch (TREBLE, 20kHz)	ASD-025-B	
S4	Rotary switch (BASS, 50Hz)	ASD-022-B	

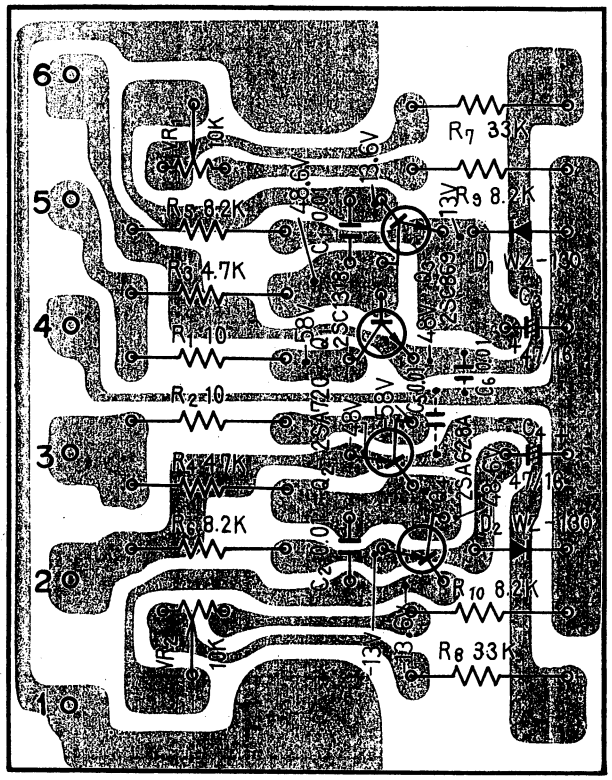
OTHERS

Symbol	Description	Part No.	
	Boss	ABN-009-0	
	Washer (9ϕ)	B22-016-0	
	Nut (9ϕ)	B71-004-0	
	Internal lock washer	ABE-001-0	

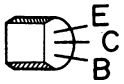
10.12 POWER SUPPLY CIRCUIT ASSEMBLY-3 (AWR-077-0)



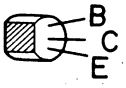
Foil Side



2SA628A
(2SA697)
(2SC1211)
2SC869



(2SA834)
(2SC1649)
2SC1318
2SA720



Parts List of Power Supply Circuit Assembly–3 (AWR-077-0)

CAPACITORS

Symbol	Description			Part No.	
C1	Ceramic	0.01	50V	CKDYF 103Z 50	
C2	Ceramic	0.01	50V	CKDYF 103Z 50	
C3	Electrolytic	47	16V	CEA 470P 16	
C4	Electrolytic	47	16V	CEA 470P 16	
C5	Ceramic	0.01	50V	CKDYF 103Z 50	
C6	Ceramic	0.01	50V	CKDYF 103Z 50	

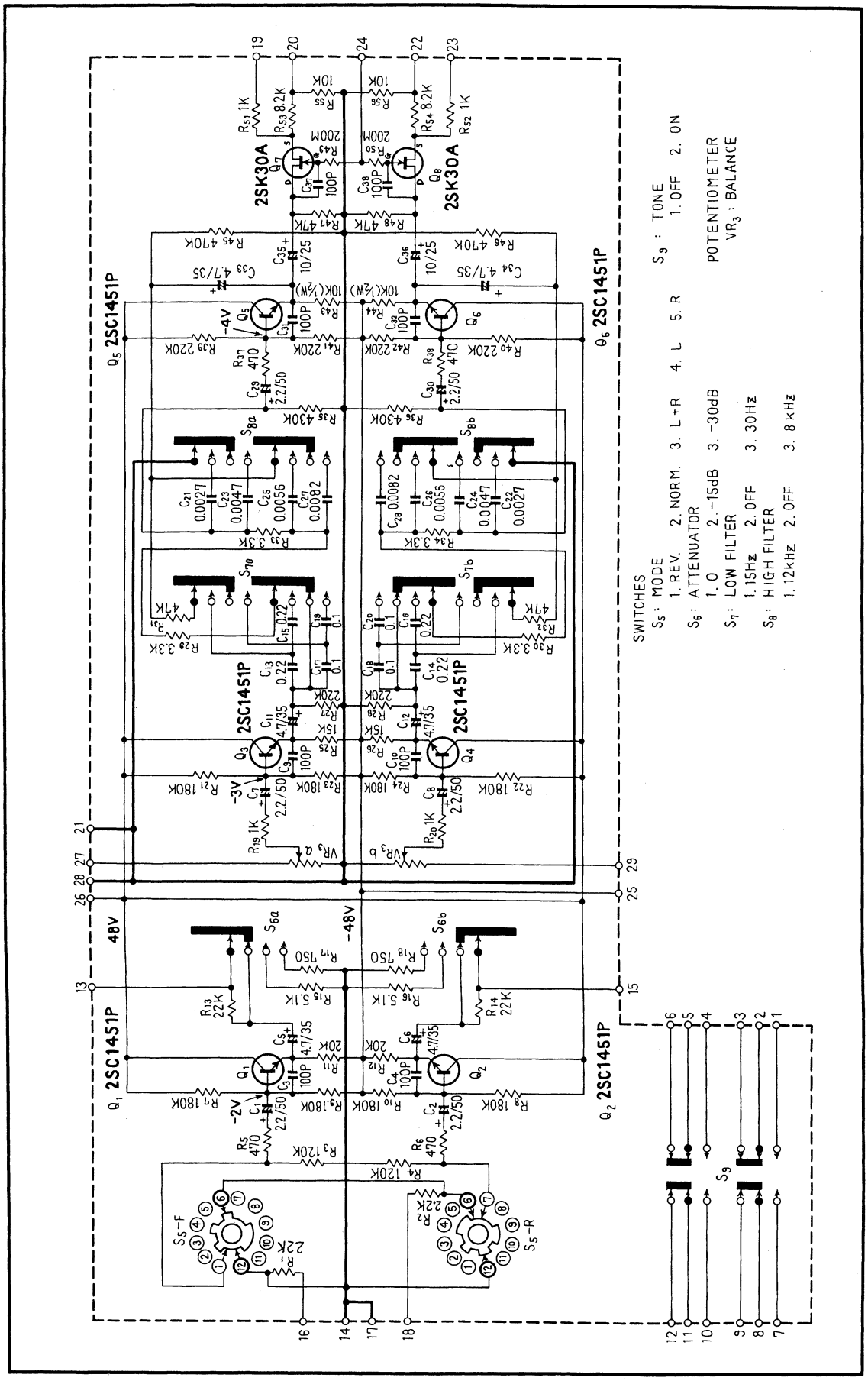
RESISTORS

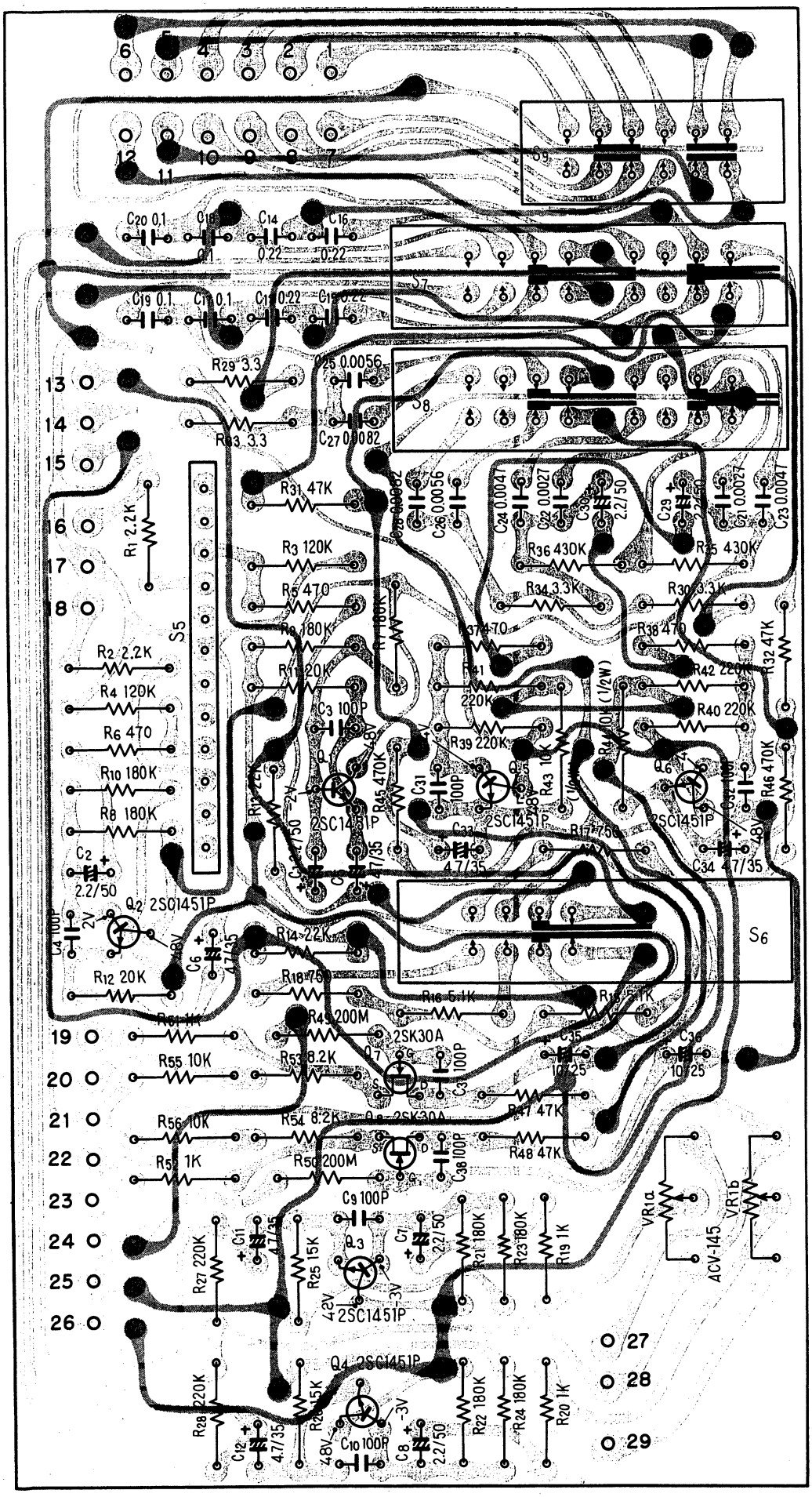
Symbol	Description		Part No.	
VR1	Semi-fixed	10k-B	ACP-036-0	
VR2	Semi-fixed	10k-B	ACP-036-0	
R1	Carbon film	10	RD¼PS 100J	
R2	Carbon film	10	RD¼PS 100J	
R3	Carbon film	4.7k	RD¼PS 472J	
R4	Carbon film	4.7k	RD¼PS 472J	
R5	Carbon film	8.2k	RD¼PS 822J	
R6	Carbon film	8.2k	RD¼PS 822J	
R7	Carbon film	33k	RD¼PS 333J	
R8	Carbon film	33k	RD¼PS 333J	
R9	Carbon film	8.2k	RD¼PS 822J	
R10	Carbon film	8.2k	RD¼PS 822J	

SEMICONDUCTORS

Symbol	Description		Part No.	
Q1	Transistor	2SC1318-R, Q or S (2SC1211-C, D or E)		
Q2	Transistor	2SA720-R, Q or S (2SA697-C, D or E)		
Q3	Transistor	2SC869-C or D (2SC1649-N or P)		
Q4	Transistor	2SA628A-C or D (2SA834-N or P)		
D1	Zener diode	WZ-130		
D2	Zener diode	WZ-130		

10.13 SWITCH CIRCUIT ASSEMBLY (AWS-080-0)




Foil Side
2SC1451P
E
B
C
2SK30A
D
G
S

Parts List of Switch Circuit Assembly (AWS-080-0)

CAPACITORS

Symbol	Description			Part No.	
C1	Electrolytic	2.2	50V	CEANL 2R2P 50	
C2	Electrolytic	2.2	50V	CEANL 2R2P 50	
C3	Ceramic	100p	50V	CCDSL 101K 50	
C4	Ceramic	100p	50V	CCDSL 101K 50	
C5	Electrolytic	4.7	35V	CEANL 4R7P 35	
C6	Electrolytic	4.7	35V	CEANL 4R7P 35	
C7	Electrolytic	2.2	50V	CEANL 2R2P 50	
C8	Electrolytic	2.2	50V	CEANL 2R2P 50	
C9	Ceramic	100p	50V	CCDSL 101K 50	
C10	Ceramic	100p	50V	CCDSL 101K 50	
C11	Electrolytic	4.7	35V	CEANL 4R7P 35	
C12	Electrolytic	4.7	35V	CEANL 4R7P 35	
C13	Electrolytic	0.22	35V	CSZA R22M 35	
C14	Electrolytic	0.22	35V	CSZA R22M 35	
C15	Electrolytic	0.22	35V	CSZA R22M 35	
C16	Electrolytic	0.22	35V	CSZA R22M 35	
C17	Electrolytic	0.1	35V	CSZA 0R1M 35	
C18	Electrolytic	0.1	35V	CSZA 0R1M 35	
C19	Electrolytic	0.1	35V	CSZA 0R1M 35	
C20	Electrolytic	0.1	35V	CSZA 0R1M 35	
C21	Mylar	0.0027	50V	CQMA 272J 50	
C22	Mylar	0.0027	50V	CQMA 272J 50	
C23	Mylar	0.0047	50V	CQMA 472J 50	
C24	Mylar	0.0047	50V	CQMA 472J 50	
C25	Mylar	0.0056	50V	CQMA 562J 50	
C26	Mylar	0.0056	50V	CQMA 562J 50	
C27	Mylar	0.0082	50V	CQMA 822J 50	
C28	Mylar	0.0082	50V	CQMA 822J 50	
C29	Electrolytic	2.2	50V	CEANL 2R2P 50	
C30	Electrolytic	2.2	50V	CEANL 2R2P 50	
C31	Ceramic	100p	50V	CCDSL 101K 50	
C32	Ceramic	100p	50V	CCDSL 101K 50	
C33	Electrolytic	4.7	35V	CEANL 4R7P 35	
C34	Electrolytic	4.7	35V	CEANL 4R7P 35	
C35	Electrolytic	4.7	35V	CEANL 4R7P 35	
C36	Electrolytic	10	25V	CEANL 100P 25	
C37	Ceramic	100p	50V	CCDSL 101K 50	
C38	Ceramic	100p	50V	CCDSL 101K 50	

RESISTORS

Symbol	Description			Part No.	
VR1	Variable resistor	50k-AC (BALANCE)		ACV-145-0	
R1	Carbon film	2.2k		RD¼PS 222J	
R2	Carbon film	2.2k		RD¼PS 222J	
R3	Carbon film	120k		RD¼PS 124J	
R4	Carbon film	120k		RD¼PS 124J	
R5	Carbon film	470		RD¼PS 471J	
R6	Carbon film	470		RD¼PS 471J	
R7	Carbon film	180k		RD¼PS 184J	
R8	Carbon film	180k		RD¼PS 184J	
R9	Carbon film	180k		RD¼PS 184J	
R10	Carbon film	180k		RD¼PS 184J	
R11	Carbon film	20k		RD¼PS 203J	
R12	Carbon film	20k		RD¼PS 203J	
R13	Carbon film	22k		RD¼PS 223J	
R14	Carbon film	22k		RD¼PS 223J	
R15	Carbon film	5.1k		RD¼PS 512J	
R16	Carbon film	5.1k		RD¼PS 512J	
R17	Carbon film	750		RD¼PS 751J	
R18	Carbon film	750		RD¼PS 751J	
R19	Carbon film	1k		RD¼PS 102J	
R20	Carbon film	1k		RD¼PS 102J	
R21	Carbon film	180k		RD¼PS 184J	
R22	Carbon film	180k		RD¼PS 184J	
R23	Carbon film	180k		RD¼PS 184J	
R24	Carbon film	180k		RD¼PS 184J	
R25	Carbon film	15k		RD¼PS 153J	
R26	Carbon film	15k		RD¼PS 153J	
R27	Carbon film	220k		RD¼PS 224J	
R28	Carbon film	220k		RD¼PS 224J	
R29	Carbon film	3.3k		RD¼PS 332J	
R30	Carbon film	3.3k		RD¼PS 332J	
R31	Carbon film	47k		RD¼PS 473J	
R32	Carbon film	47k		RD¼PS 473J	
R33	Carbon film	3.3k		RD¼PS 332J	
R34	Carbon film	3.3k		RD¼PS 332J	
R35	Carbon film	430k		RD¼PS 434J	
R36	Carbon film	430k		RD¼PS 434J	
R37	Carbon film	470		RD¼PS 471J	
R38	Carbon film	470		RD¼PS 471J	
R39	Carbon film	220k		RD¼PS 224J	
R40	Carbon film	220k		RD¼PS 224J	
R41	Carbon film	220k		RD¼PS 224J	
R42	Carbon film	220k		RD¼PS 224J	
R43	Carbon film	10k	½W	RD½PS 103J	
R44	Carbon film	10k	½W	RD½PS 103J	
R45	Carbon film	470k		RD¼PS 474J	

Continued on the Next Page

Symbol	Description	Part No.	
R46	Carbon film 470k	RD¼PS 474J	
R47	Carbon film 47k	RD¼PS 473J	
R48	Carbon film 47k	RD¼PS 473J	
R49	Carbon composition 200M	ACN-001-0	
R50	Carbon composition 200M	ACN-001-0	
R51	Carbon film 1k	RD¼PS 102J	
R52	Carbon film 1k	RD¼PS 102J	
R53	Carbon film 8.2k	RD¼PS 822J	
R54	Carbon film 8.2k	RD¼PS 822J	
R55	Carbon film 10k	RD¼PS 103J	
R56	Carbon film 10k	RD¼PS 103J	

SEMICONDUCTORS

Symbol	Description	Part No.	
Q1	Transistor 2SC1451P-V or S		
Q2	Transistor 2SC1451P-V or S		
Q3	Transistor 2SC1451P-V, B or S		
Q4	Transistor 2SC1451P-V, B or S		
Q5	Transistor 2SC1451P-V, B or S		
Q6	Transistor 2SC1451P-V or S		
Q7	Transistor 2SK30A-Y or GR		
Q8	Transistor 2SK30A-Y or GR		

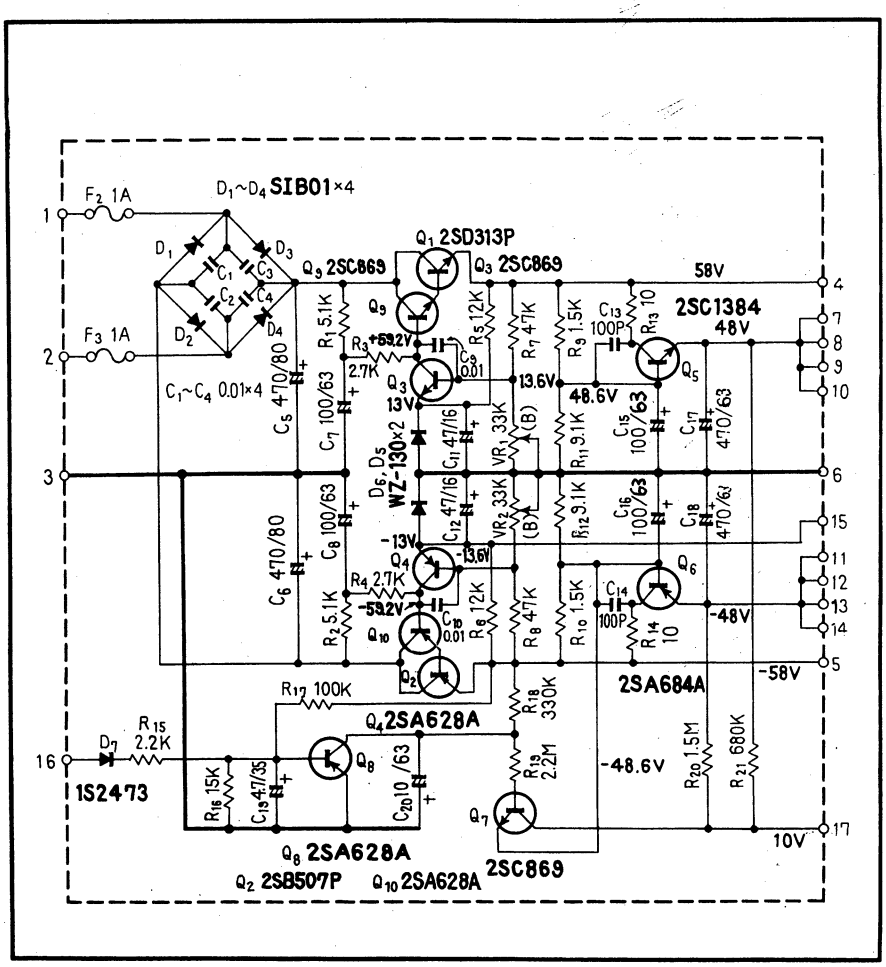
SWITCHES

Symbol	Description	Part No.	
S1	Rotary switch (MODE)	ASD-020-A	
S2	Lever switch (ATTENUATOR)	ASK-087-A	
S3	Lever switch (LOW FILTER)	ASK-085-0	
S4	Lever switch (HIGH FILTER)	ASK-085-0	
S5	Lever switch (TONE)	ASK-091-A	

OTHERS

Symbol	Description	Part No.	
	Nut (9ϕ)	B71-004-0	
	Internal lock washer	ABE-001-0	
	Screw	ABA-002-0	

10.14 POWER SUPPLY CIRCUIT ASSEMBLY-2 (AWR-070-B, AWR-088-0)



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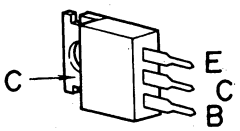
2SB507P



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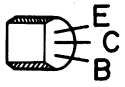

2SC1649
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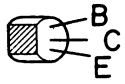
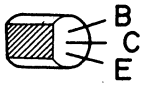
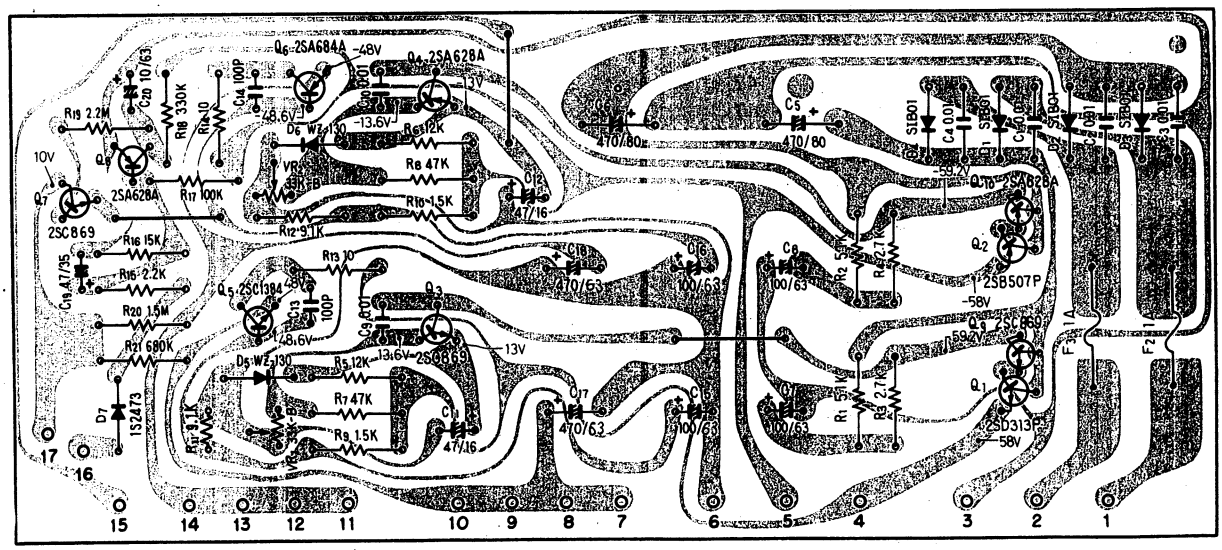


2SC1384
2SA684A



Foil Side



Parts List of Power Supply Circuit Assembly-2 (AWR-070-B, AWR-088-0)

AWR-070: D type (3-line voltage)
AWR-088: GN type (220V only)

CAPACITORS

Symbol	Description			Part No.	
C1	Ceramic	0.01	150V	ACG-004-0	
C2	Ceramic	0.01	150V	ACG-004-0	
C3	Ceramic	0.01	150V	ACG-004-0	
C4	Ceramic	0.01	150V	ACG-004-0	
C5	Electrolytic	470	80V	ACH-038-0	
C6	Electrolytic	470	80V	ACH-038-0	
C7	Electrolytic	100	63V	CEA 101P 63	Surge temperatures+85°C
C8	Electrolytic	100	63V	CEA 101P 63	Surge temperatures+85°C
C9	Ceramic	0.01	50V	CKDYF 103Z 50	
C10	Ceramic	0.01	50V	CKDYF 103Z 50	
C11	Electrolytic	47	16V	CEA 470P 16	
C12	Electrolytic	47	16V	CEA 470P 16	
C13	Ceramic	100p	50V	CCDSL 101K 50	
C14	Ceramic	100p	50V	CCDSL 101K 50	
C15	Electrolytic	100	63V	CEA 101P 63	Surge temperatures+85°C
C16	Electrolytic	100	63V	CEA 101P 63	Surge temperatures+85°C
C17	Electrolytic	470	63V	CEA 471P 63	
C18	Electrolytic	470	63V	CEA 471P 63	
C19	Electrolytic	4.7	35V	CEA 4R7P 35	
C20	Electrolytic	10	63V	CEA 100P 63	

RESISTORS

Symbol	Description		Part No.	
R1	Carbon film	5.1k	RD¼PS 512J	
R2	Carbon film	5.1k	RD¼PS 512J	
R3	Carbon film	2.7k	RD¼PS 272J	
R4	Carbon film	2.7k	RD¼PS 272J	
R5	Carbon film	12k	RD¼PS 123J	
R6	Carbon film	12k	RD¼PS 123J	
R7	Carbon film	47k	RD¼PS 473J	
R8	Carbon film	47k	RD¼PS 473J	
R9	Carbon film	1.5k	RD¼PS 152J	
R10	Carbon film	1.5k	RD¼PS 152J	
R11	Carbon film	9.1k	RD¼VS 912J	
R12	Carbon film	9.1k	RD¼PS 912J	
R13	Carbon film	10	RD¼PS 100J	
R14	Carbon film	10	RD¼PS 100J	
R15	Carbon film	2.2k	RD¼PS 222J	
R16	Carbon film	15k	RD¼PS 153J	
R17	Carbon film	100k	RD¼PS 104J	
R18	Carbon film	330k	RD¼PS 334J	
R19	Carbon film	2.2M	RD¼PS 225J	
R20	Carbon film	1.5M	RD¼PS 155J	
R21	Carbon film	680k	RD¼PS 684J	

Symbol	Description		Part No.	
VR1	Semi-fixed	33k-B	ACP-025-0	
VR2	Semi-fixed	33k-B	ACP-044-0	

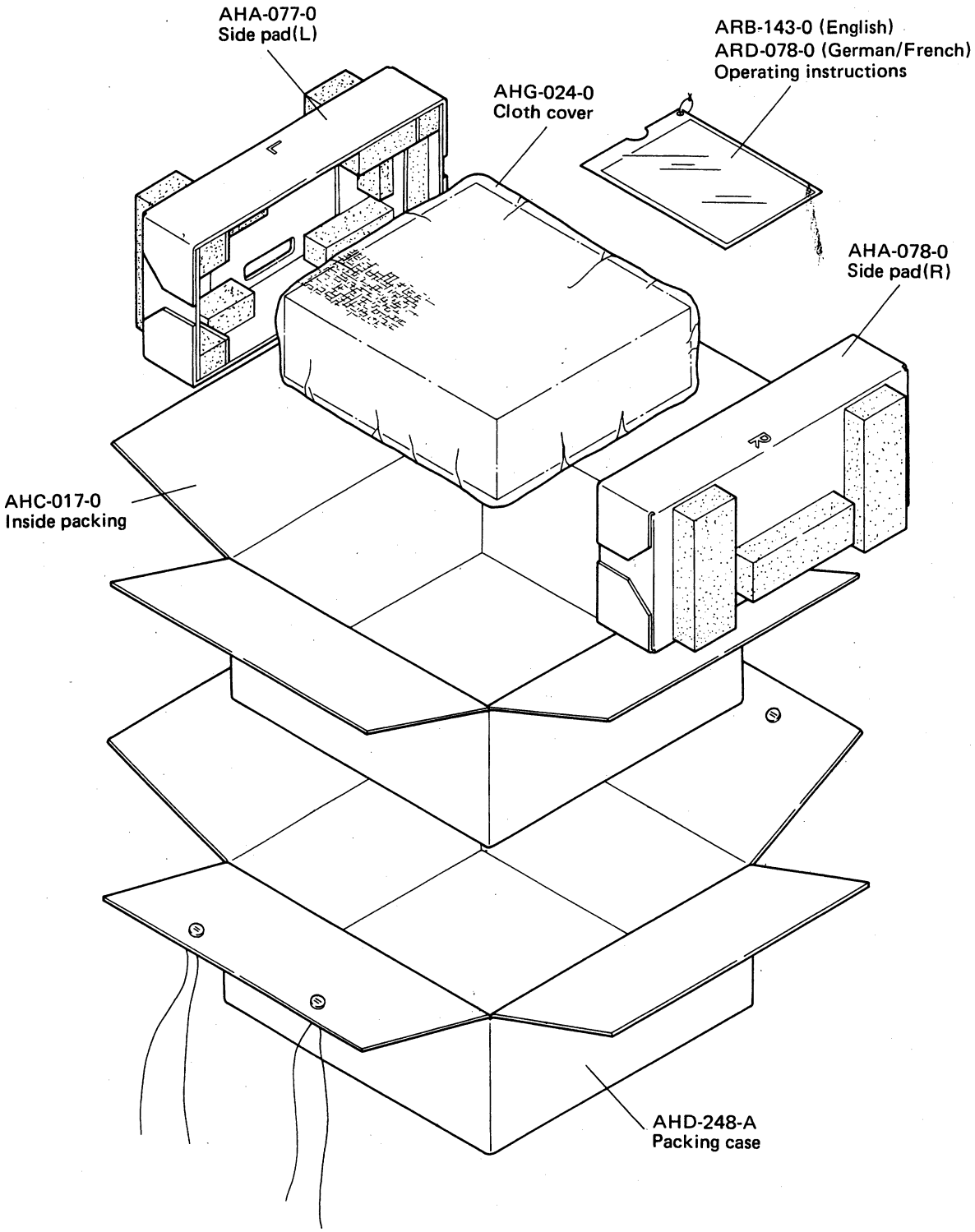
SEMICONDUCTORS

Symbol	Description		Part No.	
Q1	Transistor	2SD313P-D or E		
Q2	Transistor	2SB507P-D or E		
Q3	Transistor	2SC869-C or D (2SC1649-N or P)		
Q4	Transistor	2SA628A-C or D (2SA834-N or P)		
Q5	Transistor	2SC1384-Q or R		
Q6	Transistor	2SA684A-Q or R		
Q7	Transistor	2SC869-C or D (2SC1649-N or P)		
Q8	Transistor	2SA628A-C or D (2SA834-N or P)		
Q9	Transistor	2SC869-C or D (2SC1649-N or P)		
Q10	Transistor	2SA628A-C or D (2SA834-N or P)		
D1	Diode	SIB01-02 (1S1886)		
D2	Diode	SIB01-02 (1S1886)		
D3	Diode	SIB01-02 (1S1886)		
D4	Diode	SIB01-02 (1S1886)		
D5	Zener diode	WZ-130		
D6	Zener diode	1S2473 (1S1555)		

OTHERS

Symbol	Description	Part No.	
	Fuse clip	AKR-013-0	AWR-070 (D)
	Fuse clip	AKR-010-0	AWR-088 (GN)
	Heat sink	ANH-259-0	

11 PACKING



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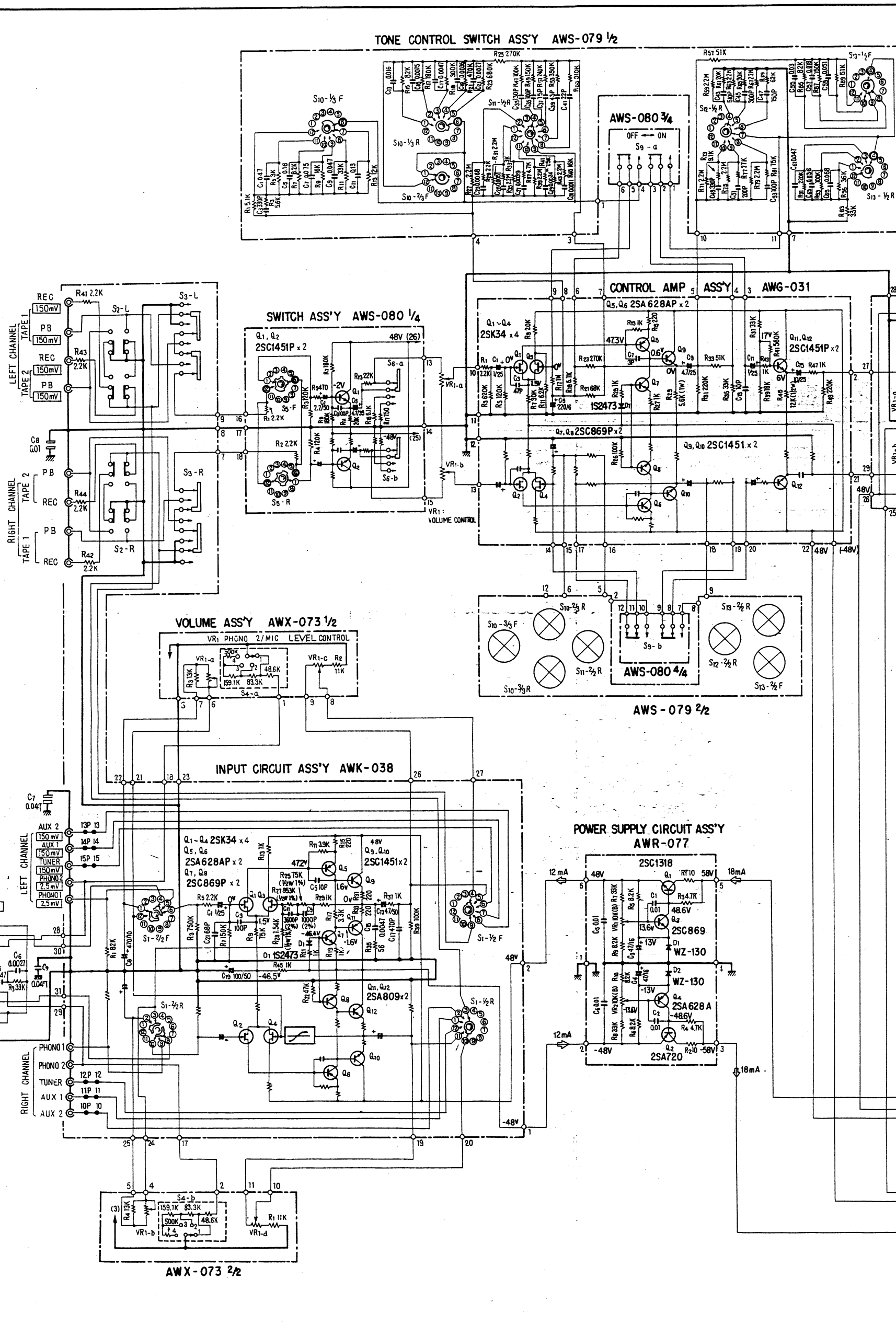
SA-9900 GN



SWITCHES

- S_1 : FUNCTION SELECT
  (1) PHONO 2/MIC (2) P
  (4) AUX 1 (5) AUX 2
- S_2 : TAPE DUPLICATE
  (1) OFF (2) ON
- S_3 : TAPE MONITOR
  (1) 1 (2) SOURCE (3)
- S_4 : PHONO 2 IMPEDAN
  (1) 35KΩ (2) 50KΩ (3)
- S_5 : MODE SELECTOR
  (1) REV (2) STEREO (
- S_6 : ATTENUATOR
  (1) 0 dB (2) -15 dB (3
- S_7 : LOW FILTER
  (1) 15 Hz (2) OFF (3)
- S_8 : HIGH FILTER
  (1) 12 KHz (2) OFF (3

PIONEER

SWITCHES

S_1 : FUNCTION SELECTOR
(1) PHONO 2/MIC (2) PHONO 1 (3) TUNER
(4) AUX 1 (5) AUX 2

S_2 : TAPE DUPLICATE
(1) OFF (2) ON

S_3 : TAPE MONITOR
(1) 1 (2) SOURCE (3) 2

S_4 : PHONO 2 IMPEDANCE
(1) 35KΩ (2) 50KΩ (3) 70KΩ (4) 100KΩ

S_5 : MODE SELECTOR
(1) REV (2) STEREO (3) L+R (4) L (5) R

S_6 : ATTENUATOR
(1) 0dB (2) -15dB (3) -30dB

S_7 : LOW FILTER
(1) 15Hz (2) OFF (3) 30Hz

S_8 : HIGH FILTER
(1) 12KHz (2) OFF (3) 8KHz

S_9 : TONE
(1) OFF (2) ON

S_{10} : BASS CONTROL (100Hz)
(1) -7.5dB ~ (11) +7.5dB 1.5dB STEP

S_{11} : TREBLE CONTROL (10KHz)
(1) -7.5dB ~ (11) +7.5dB 1.5dB STEP

S_{12} : TREBLE CONTROL (20KHz)
(1) -4.5dB ~ (7) +4.5dB 1.5dB STEP

S_{13} : BASS CONTROL (50Hz)
(1) -4.5dB ~ (7) +4.5dB 1.5dB STEP

S_{14} : PRE/POWER AMP
(1) NORMAL (2) SEPARATED

S_{15} : SPEAKER SELECTOR
(1) OFF (2) A (3) B (4) A+B

S_{16} : RELAY

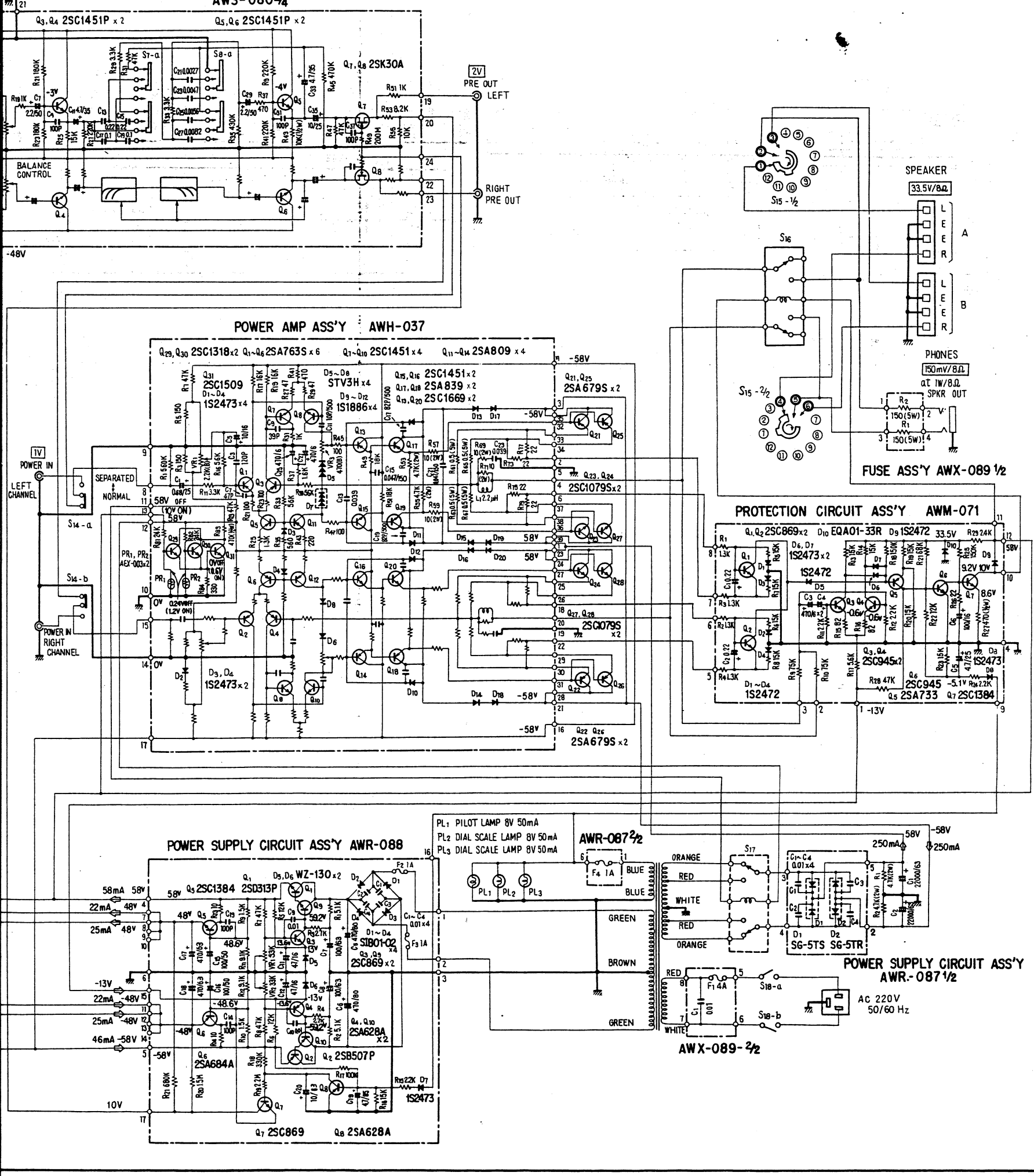
S_{17} : RELAY

S_{18} : POWER
(1) OFF (2) ON

NOTES
RESISTORS
IN OHM, 1/4W, ±5% TOLERANCE UNLESS OTHERWISE NOTED K: KΩ M: MΩ

CAPACITORS
IN μF UNLESS OTHERWISE NOTED. P: pF

[V] : SIGNAL VOLTAGE NECESSARY FOR OBTAINING 140W/8Ω OUTPUT POWER (1KHz)
V : DC VOLTAGE AT NO INPUT SIGNAL
⇦ A : DC CURRENT AT NO INPUT SIGNAL



SA-9900 D

TONE CONTROL SWITCH ASS'Y AWS-079 1/2

AWS-080 3/4

AWS-079 2/2

CONTROL AMP ASS'Y AWG-031

SWITCH ASS'Y AWS-080 1/4

VOLUME ASS'Y AWX-073 1/2

AWS-080 4/4

INPUT CIRCUIT ASS'Y AWK-038

AWX-073 2/2

POWER SUPPLY CIRCUIT ASS'Y AWR-077

SWITCHES

S1 : FUNCTION SELE
(1) PHONO 2/MIC (2
(4) AUX 1 (5) AU
S2 : TAPE DUPLICAT
(1) OFF (2) ON
S3 : TAPE MONITOR
(1) 1 (2) SOURCE
S4 : PHONO 2 IMPED
(1) 35KΩ (2)50KΩ
S5 : MODE SELECTO
(1) REV (2) STEREO
S6 : ATTENUATOR
(1) 0 dB (2) -15 dB
S7 : LOW FILTER
(1) 15Hz (2) OFF
S8 : HIGH FILTER
(1) 12 KHz (2) OFF

PIONEER

SWITCHES

S_1 : FUNCTION SELECTOR
(1) PHONO 2/MIC (2) PHONO 1 (3) TUNER
(4) AUX 1 (5) AUX 2

S_2 : TAPE DUPLICATE
(1) OFF (2) ON

S_3 : TAPE MONITOR
(1) 1 (2) SOURCE (3) 2

S_4 : PHONO 2 IMPEDANCE
(1) 35KΩ (2) 50KΩ (3) 70KΩ (4) 100KΩ

S_5 : MODE SELECTOR
(1) REV (2) STEREO (3) L+R (4) L (5) R

S_6 : ATTENUATOR
(1) 0 dB (2) -15 dB (3) -30 dB

S_7 : LOW FILTER
(1) 15Hz (2) OFF (3) 30Hz

S_8 : HIGH FILTER
(1) 12 KHz (2) OFF (3) 8 KHz

S_9 : TONE
(1) OFF (2) ON

S_{10} : BASS CONTROL (100Hz)
(1) -7.5dB ~ (11) +7.5dB 1.5dB STEP

S_{11} : TREBLE CONTROL (10KHz)
(1) -7.5dB ~ (11) +7.5dB 1.5dB STEP

S_{12} : TREBLE CONTROL (20KHz)
(1) -4.5dB ~ (7) +4.5dB 1.5dB STEP

S_{13} : BASS CONTROL (50Hz)
(1) -4.5dB ~ (7) +4.5dB 1.5dB STEP

S_{14} : PRE/POWER AMP
(1) NORMAL (2) SEPARATED

S_{15} : SPEAKER SELECTOR
(1) OFF (2) A (3) B (4) A+B

S_{16} : RELAY

S_{17} : RELAY

S_{18} : POWER
(1) OFF (2) ON

NOTES
RESISTORS
IN OHM, 1/4 W, ± 5% TOLERANCE UNLESS OTHERWISE NOTED K : KΩ M : MΩ

CAPACITORS
IN μF UNLESS OTHERWISE NOTED. P : pF

[V] : SIGNAL VOLTAGE NECESSARY FOR OBTAINING 140W/8Ω OUTPUT POWER (1KHz)
V : DC VOLTAGE AT NO INPUT SIGNAL
⇦ A : DC CURRENT AT NO INPUT SIGNAL

AWG-031

AWS-080 2/4

POWER AMP ASS'Y AWH-037

POWER SUPPLY CIRCUIT ASS'Y AWR-070

AWR-069 2/2

PROTECTION CIRCUIT ASS'Y AWM-071

FUSE ASS'Y AWX-087 1/2

POWER SUPPLY CIRCUIT ASS'Y AWR-069

AWX-087 2/2

SPEAKER 33.5V/8Ω

PHONES 150mV/8Ω at 1W/8Ω

SPKR OUT

LINE VOLTAGE SELECTOR (220V SET)

AC 120/220/240V 50/60 Hz

AC OUTLETS SWITCHED TOTAL 100W MAX UNSWITCHED 100W MAX